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COMPUTERWORLD

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Dbase IV veil to lift

Patterned after DB2 to meet SQL demand

BY DOUGLAS BARNEY
CW STAFF

The long wait for Dbase IV will end next Wednesday when Ashton-Tate Corp. introduces the product in New York. Dbase IV will use a version of SQL patterned after IBM's DB2 but initially will not provide a communications link to that popular host data base management system.

The product, eagerly awaited by an installed base of more than 1.5 million Dbase users, was originally scheduled for announcement at Comdex/Fall '87 in November, according to a former key member of the development staff and other sources close to Ashton-Tate. Development delays resulted from changes in design goals, technical glitches and turnover in the development staff, those sources said.

Information on product pricing, availability and upgrade policies was not available by press time. Citing a policy of not discussing unannounced products, Ashton-Tate declined to comment.

Change of plans

The company originally planned a partial implementation of SQL aimed at familiarizing Dbase users with a sample of SQL commands, according to the developer and other sources. In response to pressure from users making the transition to SQL-based systems and increasing competition, Ashton-Tate radically shifted that goal in mid-1987 to more fully implement SQL, an analyst briefed by Ashton-Tate said.

Such an implementation of SQL will eventually allow Dbase IV to communicate effectively with the recently announced Ashton-Tate/Microsoft Corp. SQL Server, a data base server

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S/36 sites: Silverlake no threat

BY JEAN S. BOZMAN
CW STAFF

Silverlake is coming. Everybody knows that by now. But at least three customers, each with installed bases of more than 2,000 IBM System/36s, are not worried about the successor to that product line dramatically impacting their operations.

Silverlake is the commonly accepted code name for the IBM system that will reportedly combine System/38 architecture with System/36 software compatibility.

And although the three organizations — a U.S. agency and two insurance companies — have invested hundreds of millions of dollars in the System/36, MIS executives at each said they are confident the system will not be obsolete anytime soon, even though it inevitably will go the way of the System/34.

These executives have re-

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IBM Cobol 85 compiler passes agency testing

BY CHARLES BABCOCK
CW STAFF

An unannounced IBM product has been approved by the National Bureau of Standards as a high-level Cobol 85 compiler and named in the NBS's January Certified Compiler List.

The chief of software testing at the NBS said Release 2.0 of IBM's VS Cobol II compiler meets most of the conditions for a validated compiler, but it will have to be retested in at least one area before the end of the year in order to maintain that stamp of approval.

While not yet widely used, Release 1.0 of VS Cobol II is IBM's only offering that lets MVS/XA users take advantage of the larger virtual memory available under that operating system. VS Cobol II compiles a Cobol program in 31-bit rather than 24-bit mode. Observers predicted use of VS Cobol II will increase now that Release 2.0 meets the conditions set forth by the American National Standards Institute for Cobol 85.

How soon the compiler will emerge as an announced product in the marketplace was not immediately clear. Industry observers predicted the waiting time will be short, but IBM officials declined to comment as of press time.

As is often the case the first time around, the IBM compiler "did not meet expectations on at least one of the tests," said L. Arnold Johnson, manager of the NBS's Software Standards Validation Group in Washington, D.C.

The validation procedure consists of a battery of tests that uphold ANSI's definition of Cobol 85. A compiler must be in substantial compliance with the standard in its first test but may misfire on one or more tests and still receive approval, Johnson explained.

Time to cram

The VS Cobol II compiler will be tested again in November; at that time, it must pass any failed tests or it will be dropped from the certified list, Johnson said. Government agencies refer to the list when reviewing contracts that include the Cobol language.

The fact that IBM sought validation at the high level is "very welcome news to all VS Cobol II shops. It takes away the apprehension some of them felt about

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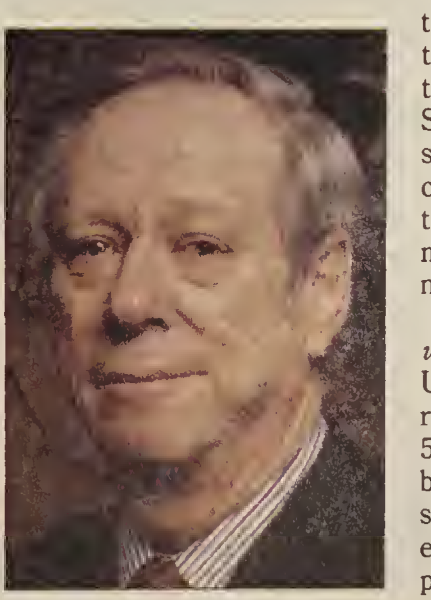
Unisys confronts power of ^{2} masters

BY CLINTON WILDER
and JEAN S. BOZMAN
CW STAFF

Skepticism prevailed in June 1986 when Burroughs Corp. Chairman W. Michael Blumenthal launched a second attempt to acquire Sperry Corp. Analysts viewed the move as a financial gambit by the shrewd former secretary of the U.S. Treasury but found it hard to see exactly how the creation of the industry's second largest company would benefit Burroughs and Sperry customers.

Today, Unisys Corp. and its "Power of 2" corporate mantra have made believers of many skeptics, particularly in the financial community. But the transition period of going from two companies to a $9.7 billion hybrid has been a difficult one, according to many Unisys customers. The same cost cutting and bottom-line orientation that have earned Blumenthal high praise on Wall Street have sometimes resulted in frustration in MIS shops.


W. Michael Blumenthal

Blumenthal "runs a lean and mean organization, and I won't tell him how to run the company," says John DiPalermo, an 1100/90 series user and deputy commissioner of information technology management for the state Department of Social Services in New York. "But he should hire more competent customer service people or pay the people that he has more money. Maybe that would make a difference."

An exclusive *Computerworld* survey last month of 104 Unisys mainframe and mid-range users found that 35% to 50% of the firm's customers believe the vendor has slipped since the merger in several areas, including maintenance, price/performance, technologi-

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NEWSPAPER
SECOND CLASS

IN THIS ISSUE

On screen. DEC confronts Sun, Apollo with high-end Vaxstation 8000, which it claims outstrips the competition with a performance of 500,000 antialiased 3-D vector/sec. Meanwhile, Sun ups prices on its 3/60 workstations and adds desktop Sparc version. Page 6. **In print.** IBM expects second-quarter releases for two high-speed nonimpact printers that support AFP software, lauds price savings on two intermediate-speed impact units. Page 10.

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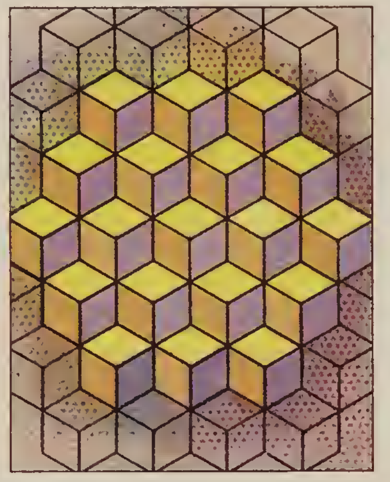

Building on DEC platforms. Pullout section follows page 88.

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Quotable

"What IBM is not willing to do is turn over the results of its significant development investment to others to use for whatever purposes they may wish."

PETER SCHNEIDER
IBM

See story page 55.

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Users of DEC equipment present special challenges for software providers. **Follows page 88.**

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Spies like U.S. — credit bureaus target of espionage

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Foreign spies are penetrating the data bases of large U.S. credit bureaus for leads on people who have both access to classified information and financial problems, according to a congressional report.

The brief report, written by a staff investigator at the U.S. House Armed Services Committee and released last month, stated that one method used by hostile intelligence agencies to select targets for espionage is to obtain information from credit reporting systems.

"Financial difficulties have . . . been a primary factor in individuals' decisions to pass classified information to hostile countries," the report said.

U.S. Department of Defense officials are concerned that the credit data bases sometimes indicate whether an individual has U.S. government security clearance. An individual's financial condition can also be screened to find out whether the person is on the verge of bankruptcy or has a gambling habit that could be exploited, the report said.

The report noted that there are five major vendors of credit reports: TRW, Inc., Chilton Corp., The Credit Bureau, Inc., Trans Union Credit Information Co. and Associated Credit Bureaus. It did not provide further details or recommend changes in credit bureau practices.

Delia Fernandez, a spokeswoman for TRW's Information Services Division in Orange, Calif., said TRW's credit reports do not mention security clearances. She added that TRW conducts investigations to ensure that its subscribers are bona fide credit issuers or businesses that need the information for employment or insurance purposes.

Foreign agents could gain illegal access to the files by obtaining a legitimate customer password or through an employee of a legitimate customer, Fernandez said.

The main thrust of the congressional report, released by Rep. John R. Kasich (R-Ohio), was to criticize the Pentagon's procedures for granting security clearances to people born in unfriendly countries. Non-U.S. citizens with security clearances are heavily recruited by spies, the report said.

Markets hit deck after nuclear scare

BY J. A. SAVAGE
CW STAFF

A worldwide communication test by the International Atomic Energy Agency (IAEA) was mistaken for a report of a nuclear accident last week, sending financial markets scurrying for fallout shelters.

Speculation of a nuclear incident in the Soviet Union reportedly sent agricultural commodities trading into a frenzy, fueling a temporary rise in the value of the dollar against currency from countries thought to be closer to the supposed accident.

The test, actually deployed Jan. 27, was the second such test using communications links set up by the World Meteorological Organization (WMO), based in Geneva, according to an IAEA spokeswoman.

The communication, which was sent to 25 of the organization's 160 member countries, asked weather service stations to pass along a partially coded test memo to their nuclear agencies and requested confirmation of receipt. Apparently, someone got hold of a confirmation, which was sent through normal communications channels, near London, according to the spokeswoman.

Transmissions vary

According to Stefan Mildner, director of basic systems for WMO's World Weatherwatch Department in Geneva, major industrialized countries are reached through dedicated lines in a main trunk network. Developing countries are reached by satellite.

"Typically, you can send the information to developed countries at speeds up to 9.8K bit/sec.," said Dick Zitzmann, chief of systems operation at the Washington, D.C.-based National Weather Service. "Data is sent to some links in lesser developed countries at low speed, like that of a teletype."

Zitzmann said that delays in information exchange are not the fault of communications links but of getting data into and picking it out of the system.

"We are providing, as part of our usual equipment, a message queue where we store warning messages of this type, which are then summoned by the Nuclear Regulatory Commission people," Zitzmann said. He estimated that the commission picks up such messages at least once a day. The National Weather Service uses three IBM 4341s.

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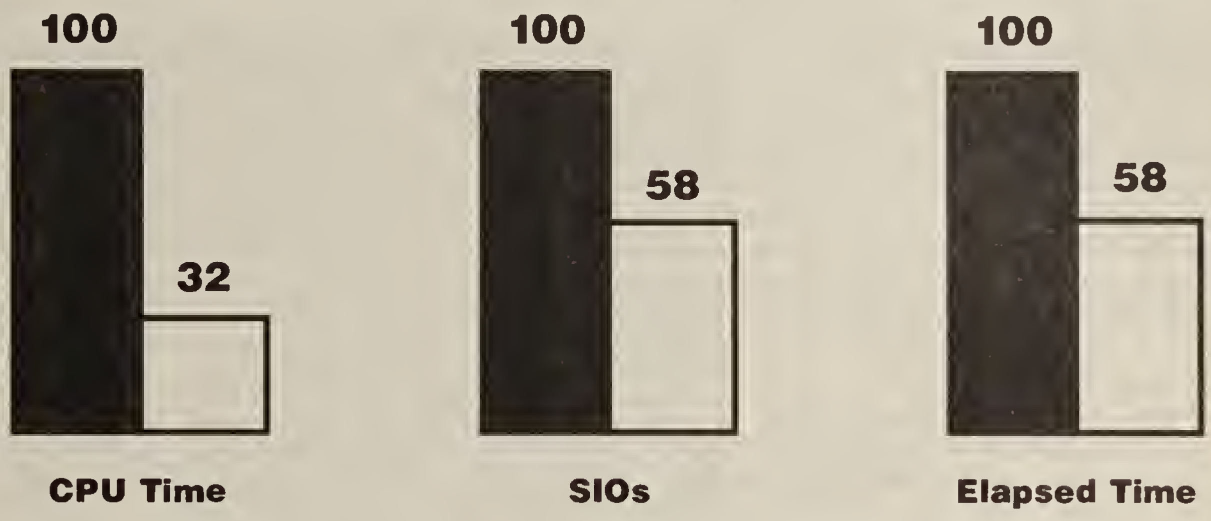

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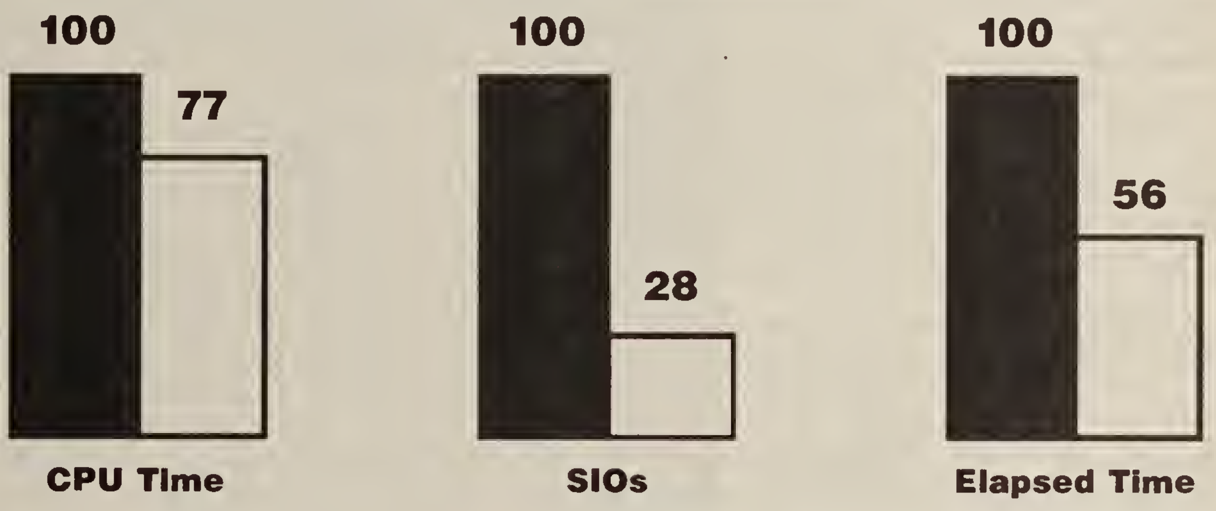

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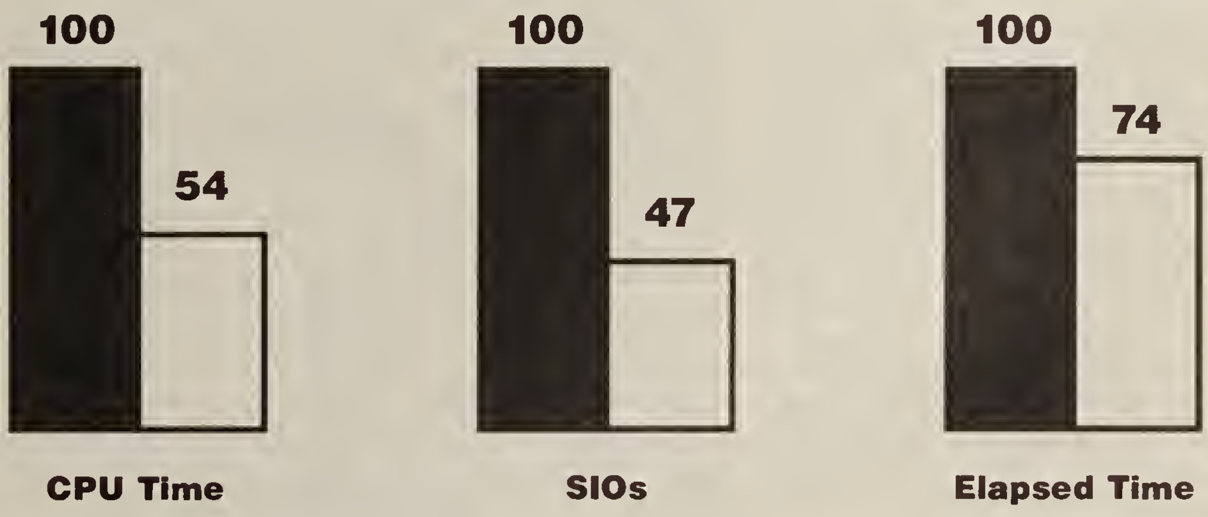

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Charles Schwab cuts staff, CPUs

Trading decline forces brokerage to cut mainframe power, personnel

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Faced with a continuing postcrash decline in trading volume, Charles Schwab & Co. has cut back on mainframe CPU power, postponed a planned data center move and off-loaded mainframe application development to microcomputers.

The discount brokerage firm's most recent cost-cutting move was last week's layoff of approximately 10 information systems employees in San Francisco and one in its New York data center.

The layoffs were reportedly the first in Schwab's DP history. They represent an abrupt turnaround from the company's goal in mid-1987 to double its data processing staff from 250 to 500.

The layoffs affected a variety of positions, from computer operations staff to senior programmers and analysts, according to Woodson M. Hobbs, executive vice-president of information systems. Ousted employees will receive one month's pay and insurance benefits in addition to job placement assistance from human resources personnel.

In December, Schwab cut its mainframe CPU power from 128 million instructions per second (MIPS) to 83 MIPS, hoping to save about $150,000 in monthly mainframe costs.

Prior to Black Monday, Schwab was running two IBM 3090 Model 400s in San Francisco and a 3083 mainframe in New York. After the Oct. 19 crash, Schwab upgraded to a 3090 Model 150 in New York and shipped a 3083 from that city to San Francisco to replace a Model 400.

The shuffle

The quick CPU shuffle is not uncommon for this fast-paced company. Since the summer of 1986, Schwab's California headquarters ran its brokerage accounting, order entry and corporate processing on two 3090 Model 200s. In October 1986, those mainframes were traded for one 3090 Model 400.

In April 1987, a 3090 Model 180 was brought on-line; it was replaced in July by another 3090 Model 400. This mainframe switching is a way of keeping up with the ebb and flow of Wall Street, Hobbs explained.

To further stretch the budget, Schwab postponed indefinitely a $20 million planned move and expansion of its data production center from the crowded confines of downtown San Francisco to nearby Sacramento. The project would have involved relocating 60 to 80 employees to the California capital.

Instead of moving, Schwab is fast-forwarding plans to bring its New York data center into a fully redundant environment. Schwab hopes to ease any future CPU crunches, such as the one that occurred during and after the October crash, as well as ensure better disaster recovery, Hobbs said.

After the stock market crash, computer systems at all financial houses were overloaded, traders were besieged with orders and many investors found it difficult to contact brokers.

"We're developing order entry and execution systems that run concurrently in New York and San Francisco, so if any software outages or failings occur in San Francisco, New York will take over," Hobbs said. New York's 3090 Model 150 will run the order entry system simultaneously with San Francisco by late this month, he added.

In addition, Schwab said it hopes to cut CPU costs further with a $2 million project that will move applications developers and programmers off mainframes and onto Intel Corp. 80386-based microcomputers.

"When we took some horsepower away, we hurt the developers. So to keep them productive, we're installing a prototype development system on personal computers," Hobbs said.

The company plans to purchase some 130 micros — most likely the IBM Personal System/2 Model 80 — assign one per developer and have them share peripherals.

The developers will share files over a local-area network and will be able to download and upload mainframe files through a gateway.

The project is still in the initial stages, and "there are a lot of issues to be resolved," Hobbs said. "There's more enthusiasm among developers about going to PCs," he added. "It puts them in their own world where they aren't dependent on a mainframe."

System/36

FROM PAGE 1

ceived confidential IBM briefings on the next-generation minicomputer. They said Silverlake machines will probably make their way into their System/36 networks by 1992.

"That is our plan," said Orville Orr, vice-president of computer operations at Farmers Insurance Group of Companies, which operates 2,800 System/36s. "We all know that one day IBM will stop upgrading the System/36 and that we're going to have to move to something else within [that] family."

Even if it is only useful until the early 1990s, the System/36 will have served its purpose for these organizations. When Farmers Group and Continental Insurance Co. in Piscataway, N.J., installed the first System/36s in the mid-1980s, they were replacing 15-year-old order-entry systems.

Updating the heartland

At the U.S. Department of Agriculture, the System/36 brought 2,790 USDA agents' offices scattered across the heartland into the 20th century.

"Before we got the System/36s in, all the reports in our country agricultural offices were done by hand," said James Dinwiddie, director of information resources management at the USDA's Agricultural Stabilization and Conservation Services agency. "The System/36s were replacing paper, pencil and typewriters."

IBM has taken steps to assure System/36 users that it will not discontinue System/36 support anytime soon.

"We'd be crazy not to support such a successful machine as the System/36," IBM marketing vice-president William O. Grabe told the fall meeting of the Common IBM users group in a speech outlining plans for the System/36 family. IBM spokesmen have said there are more than 150,000 System/36s installed worldwide.

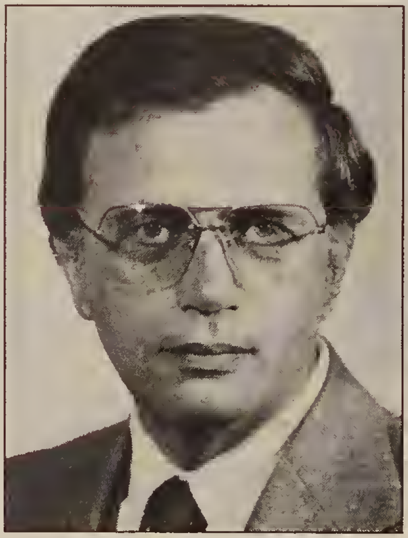
Assurances like that aside, the System/36's ability to function as both a stand-alone processor in remote offices and as a node in mainframe-based Systems Network Architecture (SNA) networks are the aspects most crucial to its loyal owners.

"The System/36 already had a lot of the connectivity features that were promised for the IBM 9370," said John B. Vande Creek, vice-president of systems architecture at Continental, which uses more than 2,000 System/36s.

Price is also a factor. "IBM has told its value-added resellers that buying more than 500 machines means you'll get more than 40% off the list price," said Steve Santoro, a former IBM executive who is now administrative manager for Adroit Systems Management, Inc. in Syosset, N.Y. "If you could buy more than that, you would probably get a volume discount approaching 50%."

Industry sources said such massive volume purchases are exceedingly cost-effective.

"Our feeling is that the System/36 is a good performer," said one Continental manager who did not wish to be named.



James Dinwiddie

Significantly, two of the three organizations have bought themselves some protection, a safety net against technological upheaval.

"IBM has a technology exchange program," said Continental's Vande Creek. "This program enables you to buy System/36s on a leased basis for 12 months, so that you have the choice of buying them or upgrading to the next system that comes along."

The USDA has another form of protection. "We have an indefinite quantity requirement clause right in our contract with IBM," Dinwiddie said. "That means I can continue to buy System/36s through the life of that contract, which runs until 1992." That would apply even if the System/36s had to be supplied on special order, Dinwiddie added.

But even that kind of legal protection cannot prevent IBM from eventually discontinuing support of the System/36 operating system and utilities, if it so wishes.

That is exactly what happened in 1985, when IBM wrote a letter to its System/34 customers to tell them it would no longer support the System/34's operating system and key utilities after February 1986. The IBM letter arrived less than three years after the System/36 was announced and two years after the System/36 was first shipped in quantity.

"You might get a letter like that," said Vande Creek, who, until recently, worked for IBM at the Rochester, Minn., System/36 plant.

"But if it did happen, you'd be operating with a very stable system. IBM would stabilize it at a level of function and performance so that it wouldn't have any bugs. Even then, IBM would probably fix a major problem if it affected a large number of users," Vande Creek added.

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DEC launches 3-D workstation challenge

BY STANLEY GIBSON
CW STAFF

BOSTON — Digital Equipment Corp. set up a high-end confrontation with key rivals in the engineering workstation market last week by announcing a three-dimensional graphics workstation developed in a two-year collaboration with Evans & Sutherland Computer Corp. in Salt Lake City.

The Vaxstation 8000 is DEC's first 3-D graphics workstation and, as the high end of the Vaxstation family, is pitted against high-performance systems sold by Sun Microsystems, Inc., Silicon Graphics, Inc., Hewlett-Packard Co. and Apollo Computer, Inc.

The workstation, priced at $87,710 for a base configuration including operating system, will be manufactured by DEC but sold by both that company and Evans & Sutherland. It is scheduled to ship next month.

The announcement took place about one month before Stellar Computer, Inc. in Newton, Mass., and Ardent Computer Corp. in Sunnyvale, Calif., said they will launch "desktop supercomputers." With these machines, the vendors promise considerably greater graphics and arithmetic performance than any machine yet announced [CW, Jan. 11].

Meanwhile, established vendors such as Apollo, Silicon Graphics and Sun have all promised more powerful systems within the year.

Acknowledging that products with some higher performance features may exist or be introduced, DEC President Ken Olsen asserted, "We're not joining in the glamour race — the MIPS race. We want to have the machine that people want to use to get work done."

But the Vaxstation 8000 claims a lead over others in the number of antialiased 3-D vector/sec. Antialiasing eliminates jagged edges on rounded contours. DEC said its system performs 500,000 3-D vector/sec., leading Silicon Graphics, which can perform 200,000.

Ultrix support planned

The workstation currently runs only the DEC VMS operating system. Support for Ultrix, DEC's version of AT&T's Unix System V, is scheduled to be available in the future, although DEC did not say when.

Rather than performing complex mathematical operations, the system was designed to connect to other computers for that purpose, DEC officials said. This approach is different from that followed by Stellar and Ardent, whose workstations themselves are intended to be capable of 40 to 60 million instructions per second (MIPS).

The Vaxstation 8000 is built around DEC's VAXBI bus and a proprietary graphics bus. Both buses run in 32-bit mode and support bandwidths of 13.3M byte/sec. Attached to the VAXBI bus are a DEC VAX 8250 processor, system memory consisting of 16M bytes with another 16M bytes optional and three Microvax II processors serving as controllers.

"Five hundred thousand vectors per second is spectacular," said Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass. However, while praising the vector performance, other analysts questioned the ability of the system to compete with others in shaded volume performance.

"Shaded performance is a lot more important than vector processing," said David Burdick, an analyst at Dataquest, Inc. in San Jose, Calif. "It's not going to be too difficult for Apollo and Sun to sell against this."

DEC said the system executes 5,000 Gouraud-shaded, or smooth-shaded, polygons per second. Silicon Graphics' Iris 4D/70 GT workstation is capable of 60,000 Gouraud-shaded polygons per second; the Stellar and Ardent workstations promise some 100,000 Gouraud-shaded polygons per second.

Richard Shaffer, an analyst with Technologic Partners in New York, agreed. "Wire frame [3-D vectors] doesn't count anymore. That's not where the market is," he said, explaining that users are increasingly looking for shaded volumes.

DEC said it expects to sell the Vaxstation 8000 to users performing mechanical computer-aided engineering in the automotive and aerospace industries as well as to users performing molecular modeling.

DEC's vice-president of product marketing, Peter Smith, said DEC is currently second overall in the workstation industry, but it is growing at a rate in excess of 100% annually in that field. That is a rate greater than that of Sun and Apollo, Smith said, although he declined to give a specific figure for DEC's workstation sales.

Big dimensions

DEC's Vaxstation 8000 lines up at the high end of the three-dimensional workstation market

	Vaxstation 8000	Apollo Computer DN 590 Turbo	Sun Microsystems Sun-4/260CXP	Silicon Graphics Iris 4D/70 GT	Hewlett-Packard HP 9000 Model 825SRX
3-D performance	500,000 3-D vector/sec. antialiased	150,000 3-D vector/sec.	150,000 3-D vector/sec.	400,000 3-D vector/sec. 200,000 antialiased	70,000 3-D vector/sec.
Shaded performance	5,000 Gouraud-shaded polygon/sec.	5,500 Gouraud-shaded polygon/sec.	20,000 Gouraud-shaded polygon/sec.	60,000 Gouraud-shaded polygon/sec.	5,100 Gouraud-shaded polygon/sec.
Price*	$87,710	$69,900	$57,900	$89,900	$69,500

* Base configuration with operating system

CW CHART

Sun serves up desktop Sparc, hikes 3/60 prices

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Reinforcing its commitment to reduced instruction set computing, Sun Microsystems, Inc. last week added a desktop version of its scalable processor architecture computers (Sparc).

At the same time, Sun said it has increased prices for its Motorola, Inc. 68020-based 3/60 line of workstations by up to 10% , a reflection of a jump in the price of 1M-bit dynamic random-access memory. A number of computer vendors have complained of a shortage in 1M-bit dynamic RAM. .

Sun officials said the shortage has not impacted product deliveries but that without the price hike, the company faced a significant impact to its gross margins.

Robert Herwick, industry analyst for Hambrecht & Quist, Inc., said Sun "picked on their hottest product" to compensate for an increase in component costs. He estimated that the Sun 3/60 makes up 25% of the company's revenue.

The Sun 3/60 is Sun's 3 million instructions per second (MIPS) system, offering between 4M and 24M bytes of RAM. Before the increase, the base price for a monochrome version was $8,900, and entry-level pricing for a color Sun 3/60 was $10,900.

Despite the timing of a price increase on a Motorola-based system with the introduction of Sun's second Sparc workstation, company officials insisted that they will continue to develop Motorola-based products.

"If Motorola continues to innovate, we will use it," said Edward Zander, vice-president of corporate marketing.

However, they pointed to Sparc as the architecture of the future. "Over time, you will see at the low end what's happening right now in the mid-range," said Sun Executive Vice-President Bernard Lacroute. "The Sparc machine is the better alternative to [Motorola]. Sparc could eventually supplant Motorola even in the low end."

At a base price of $18,900, Sun's new desktop Sparc system, the second in that line, carries a hefty price tag when compared with the desktop Sun 3/60. However, the Sparc machine offers a significant boost in performance compared with its Motorola counterpart.

While the Sun 3/60 offers 3 MIPS of performance, the new Sun 4/110 boasts 7 MIPS. It offers between 8M and 32M bytes of RAM, compared with 4M and 24M bytes of RAM. However, Sun 4/110s with more than 8M bytes of RAM will not be available until this summer, according to the company.

Sun's Sparc workstations are source-code compatible with the firm's Motorola-based line. Disk storage capacity ranges from 141M to 1.3G bytes, depending on the configuration.

The new system was greeted favorably by industry watchers. "It certainly offers the leading price/performance on the desk top," said Michael Orsak, industry analyst for Robertson, Colman and Stephens in San Francisco. "From the customers' perspective, they're getting a choice. They can buy what they want — Motorola or Sparc — and run the same software on it."

Sun officials said the Sun 4 line — launched last July with its Sun 4/200 series, a 10 MIPS deskside system — will account for 15% of the company's revenue in the quarter ending June 30.

ENIAC activist Brainerd dies

Developed first general-purpose computer

BY J. A. SAVAGE
CW STAFF

John Grist Brainerd, who oversaw the development of the first general-purpose electronic computer in the early 1940s, died Monday at age 83 in Kennett Square, Pa.

Until late last year, Brainerd was involved with the Moore School of Engineering at the University of Pennsylvania, holding the title of professor emeritus of engineering.

He received a bachelor's degree from the university in 1925 and a Ph.D. in 1934 and was director of the Moore School from 1954 to 1971.

Brainerd is credited for convincing the U.S. Army to fund ENIAC, or the Electronic Numerical Integrator and Calculator, despite opposition to the idea from his peers. The machine was developed as part of the war effort to help determine trajectories of artillery shells. By the time ENIAC was unveiled on Valentine's Day in 1946, the war had ended. But because it was the first general-purpose computer, it was then used by scientists to resolve calculations for the development of the hydrogen bomb.

ENIAC was the world's largest computing machine, filling a 30- by 50-ft room and containing 18,000 vacuum tubes. Brainerd's peers considered the vacuum tubes to be the weak link in the computer, but the machine operated them at less than capacity to keep them from failing.

The other developers of ENIAC, John Mauchly and J. Presper Eckert, established Eckert-Mauchly Computer Corp. That company was bought by Remington-Rand Corp. in 1950. Brainerd chose to stay in the academic world.

CORRECTIONS

Texaco and Pennzoil co. have not merged [CW, Dec. 28, 1987/Jan.4, 1988]. The possible merger of the companies has not been consummated yet because of unresolved issues.

In the Spotlight chart on Terminals and Terminal Emulation Products [CW, Jan. 11], the phone number for Term-Tronics, Inc. should be 619-565-6330.

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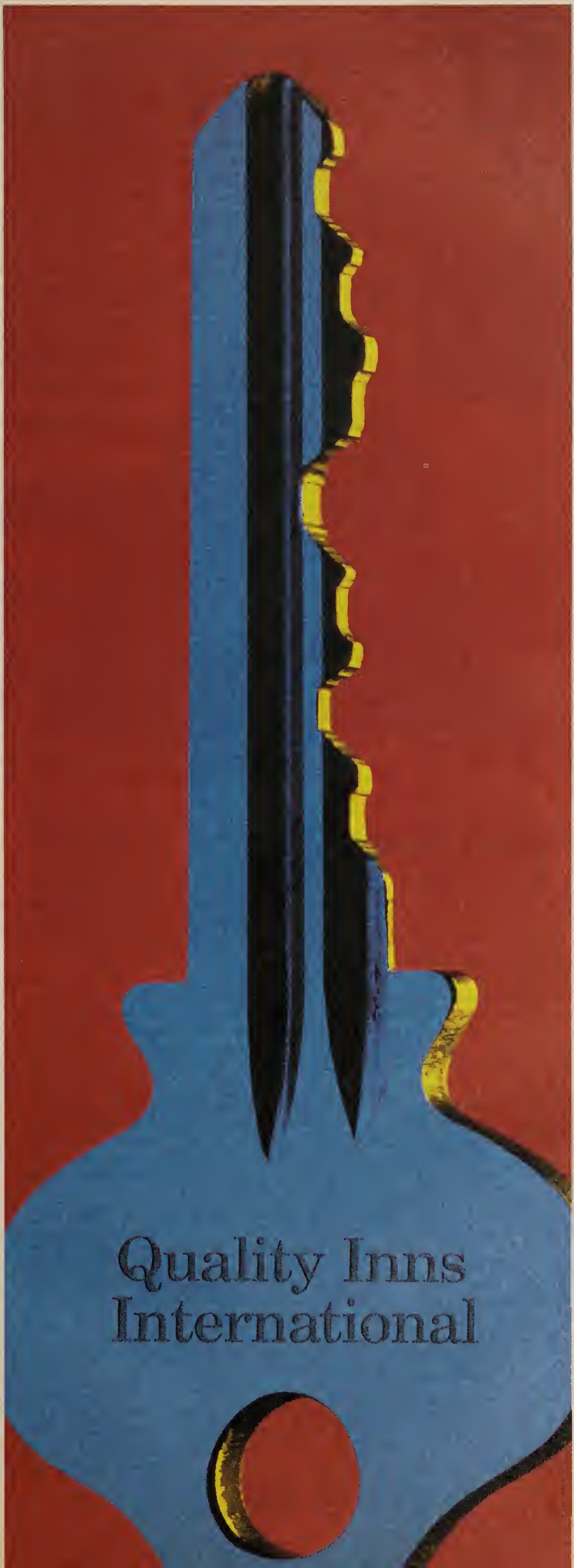

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Once grand NCC nixed this year

BY ALAN J. RYAN
CW STAFF

The National Computer Conference (NCC), once the grandest trade show in the country, is dead — at least for this year.

Last week, the board of NCC canceled plans to stage the show, originally set for May in Los Angeles. The announcement may well be the final chapter in the saga of a conference that was once the jewel of computer exhibitions but fell victim to careless management.

In 1983, NCC boasted nearly 700 exhibitors and 100,000 attendees. Ironically, the sound health of the show — combined with show management's reluctance to limit attendance — may have contributed to its decline and fall.

'Too successful'

"At one point, NCC was too successful," said Holly Bourne, director of marketing services at Fujitsu America, Inc. in San Jose, Calif. "It was hard for any exhibitor to stand out." Corridors overflowing with hordes of attendees in 1983 gave way to more exhibitors but fewer attendees in following years.

By 1987's Chicago exposition last summer, NCC had whithered. The show, which had once occupied both floors of Chicago's giant McCormick Place and spilled over to local hotels, filled only half of one floor last year.

Longtime supporters skipped out just weeks prior to the show's opening. Attendance dropped to 16,000, and only 150 vendors exhibited.

Observers said NCC's weakness became readily apparent in 1985 as more vertically oriented and regional shows began to draw attendees away from NCC. "The Interface Group [sponsors of Comdex] has been making a concerted effort to kill NCC," said Lynne Howell, director of corporate exhibits at Northern Telecom, Inc. in Nashville.

Howell said the quality of NCC attendees declined as their numbers dropped. "When you have little kids tromping through the exhibit halls and students passing out resumes, it makes it hard for a company to justify" attending, she said.

Hard to handle

"Unfortunately, NCC didn't seem able to get a handle on its focus," said Eileen Riley, trade show coordinator at Oracle Corp. in Belmont, Calif.

Despite the poor showing at NCC last year, the NCC board made a final attempt to revive the nation's longest running computer show, renaming it the National Computer Exposition/National Computer Conference and moving it to Los Angeles in May, before canceling last week.

Carroll Lewis, an NCC board member, said no decision has yet been made about future NCC shows.

DP salaries up average of 4.2%

BY DAVID A. LUDLUM
CW STAFF

Companies have boosted pay for data processing hires an average of 4.2% from last year's levels, according to a study released last week.

This year brings relatively large increases in starting pay levels for electronic data processing (EDP) auditors, systems and programming managers, operations clerks and data entry clerks, according to the annual report by recruiting firm Robert Half International, Inc.

The study breaks out findings for DP shops whose professional staffs number more than 50, 15 to 49 or fewer than 15.

For large shops, there are gains of more than 5% for EDP audit staff members (7%), programmer/analysts (6.3%), systems and programming managers (5.4%) and operations I/O clerks (5.3%). Top DP managers and data base managers showed the smallest gains, between 1% and 1.4%.

Less is more

Gains are greater in small and medium-size installations, where pay is lower. At medium-size firms, increases are greater than 6% for data entry clerks (8.8%), telecom specialists (6.3%), senior EDP auditors (6.2%) and data base analysts (6.1%).

At small installations, the big gains are for data entry clerks (9.3%), operations I/O clerks (8.2%) and systems and programming managers (7.6%).

Prevailing wages

Starting salaries for managers this year at large, medium and small MIS installations; figures are based on openings reported to a personnel recruiter

Position	Large (50 or more professionals)	Medium (49 to 15 professionals)	Small (Fewer than 15 professionals)
Vice-president of MIS	$71,000 to $101,000	$58,000 to $81,000	NA*
MIS director	$61,000 to $81,000	$47,000 to $59,000	$37,000 to $50,000
Systems and programming manager	$44,000 to $53,000	$38,000 to $48,000	$34,500 to $43,000
Data base manager	$56,000 to $65,000	$37,000 to $45,000	NA
Operations manager	$34,000 to $44,000	$32,000 to $42,000	$26,000 to $35,000

* Not applicable

INFORMATION PROVIDED BY ROBERT HALF INTERNATIONAL, INC.
CW CHART

The survey reflects geographic differences in salaries for jobs paying less than $50,000 a year. They include premiums of 5% for Connecticut, Massachusetts and California and discounts of nearly 10% for many Southern states.

THIS YEAR brings relatively large increases in starting pay levels, according to the report.

The big city

Salaries in cities with one million or more people tend to be 5% higher than elsewhere, the study said.

The report, based on job orders to the firm's 130 U.S. offices, reflects more modest pay increases than a recent study by another recruiter, Source Services Corp., which reported a gain of 7.1% [CW, Jan. 11].

The Robert Half survey reflects ranges of starting base pay reported by corporate clients, while Source Services' study includes current salaries reported by prospective new hires, spokesmen for each firm said.

ANSI to nudge C standard closer to reality

BY CHARLES BABCOCK
CW STAFF

A standard for the C programming language will move closer to reality this week when a technical panel of the American National Standards Institute (ANSI) submits a draft for a second round of public comment.

The first round elicited 32 letters with 500 requests for changes in the proposed standard. These surfaced during a public comment period running from November 1986 through March 1987.

The X3J11 technical review committee of ANSI has been at work on a standard for 4½ years, according to Thomas Plum, committee vice-chairman.

A standard for C is considered crucial, since many software developers are turning to it as the language that promises the greatest portability across hardware platforms.

C emerged from Bell Telephone Laboratories, Inc. in Murray Hill, N.J., in the late 1970s as a language with high-level data structures that, nevertheless, allowed programmers to deal with machine-level entities at a low level.

It thus came to be viewed as modern and flexible and, at the same time, "close to the guts of a machine," in the words of one software developer.

Useful data

Plum said the second draft of the standard incorporates useful data types not previously included in the language, such as long, double floating-point numbers and unsigned long integers. The second draft also includes low-level support for multibyte characters, such as those used to represent Japanese or Chinese characters.

Plum said the C technical review committee consists of 100 members, two-thirds of them C vendors. "So far, all commercial versions of C are converging on the C language standard. Nobody's going off in other directions," he said.

The Unix operating system and most applications for it are written in C. The language gains its portability feature by making use of a function library to provide I/O, mathematics, exception handling, string and character manipulation and dynamic memory management.

Putting such functions in a standard library allows the machine procedures code to be contained in a compact, well-defined division.

Included in SAA

C was included in IBM's Systems Application Architecture, one of three languages so included, and has come to be regarded as a compact language that is more efficient than the fourth-generation languages with which it once competed.

Comments on the current draft of the standard for C will be accepted by the X3J11 committee from Feb. 12 through April 12. Copies of the draft may be obtained from Global Engineering Documents, Inc. by calling 800-854-7179.

The $65 document includes directions for how to inform the ANSI X3 parent committee in Washington, D.C., of any recommendations.

Cobol 85

FROM PAGE 1

migrating their programs to VS Cobol II," said Jerome Garfunkel, a Cobol consultant in Litchfield, Conn.

Until IBM received the validation, VS Cobol II users were left up in the air about how far they should go in converting their Cobol programs to VS Cobol II. If IBM brought forth a product other than VS Cobol II that met the Cobol 85 standard, they would have to undergo a second conversion, commented Garfunkel, a member of the ANSI X3J4 Cobol 85 committee.

Portability

Bruce L. Gaarder, data processing manager at Donohue Enterprises, Inc. in Minneapolis and former chairman of the Twin Cities Digital Equipment Corp. users group, said Cobol 85 will make Cobol programs more portable between DEC VAXs and IBM mainframes.

With its more precisely defined commands and structured programming concepts, an application written in Cobol 85 could run in either environment with fewer changes than earlier versions of the language required, Gaarder said. DEC recently received validation for its VAX Cobol.

Cobol 85 will make programming skills in mixed vendor shops more versatile, he added.

Reason to believe

Garfunkel said IBM's validated Cobol 85 compiler will provide IBM customers with a reason to go ahead and use the advanced version of the language for production systems.

Gaarder disagreed, saying Cobol 85 did not need any additional coronation once the federal government required it for contracts containing Cobol software.

So far, few mainframe Cobol users have begun large-scale conversion of existing programs to VS Cobol II, industry observers said. IBM sought the high-level rating even though a lower, intermediate-level rating was available and required fewer functions.

In addition to IBM and DEC, only Tandem Computers, Inc. and NCR Corp. have Cobol 85 compilers for minicomputers or mainframes.

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IBM offers cut-sheet duplex printing

BY ALAN ALPER
CW STAFF

NEW YORK — Expanding its broad array of printers, IBM last week unveiled two high-speed nonimpact units that support its Advanced Function Printing (AFP) software and two intermediate-speed impact devices.

With its new 3827, IBM is offering cut-sheet duplex printing for the first time. The nonimpact printer prints at a speed of 92 page/min and can print two million pages per month, the company said. The device uses an LED print engine from an unspecified vendor.

In a separate announcement, Eastman Kodak Co. said it had signed a contract to supply cut-sheet, electrophotographic printer engines to IBM, but IBM would not say whether the 3827 uses Kodak's engine.

IBM claimed that the 3827 has the shortest duplex paper path in the industry and can automatically switch from single- to double-sided printing.

Priced at $185,000, the 19-sq-ft printer will be available in the second quarter, IBM said.

A month, a million

The other nonimpact unit is an 88 page/min laser printer offering a fanfold paper printing capability. The 3835 accommodates paper up to 15 in. wide and can print up to 1.8 million pages per month, the company claimed.

Priced at $135,000, the 18-sq-ft printer will also be available in the second quarter, IBM said.

Run the presses

IBM's latest printers offer different technologies for IBM 370 users

	Technology	Print speed	Duty cycle	Price	Availability
3827	LED, cut sheet, duplex	92 page/min	2 million page/ month	$185,000	Second quarter
3835	Laser, fanfold paper	88 page/min	1.8 million page/ month	$135,000	Second quarter

INFORMATION PROVIDED BY IBM
CW CHART

Like IBM's earlier models, the new nonimpact printers support AFP software, a set of products that enables users to mix text, data, graphics and images on a single page.

IBM has enhanced AFP to support the printers but has not changed any of its functionality, said William Wilson, group director of large systems management for IBM's U.S. Marketing and Services Group.

AFP has all-points addressability for mixed graphics and text applications and can be used to create electronic forms. Both printers can, therefore, be used in a variety of business or presentation graphics applications or for traditional data processing output.

IBM Models 3800 and 3812 also support AFP, so if users want to change nonimpact printers in a systems configuration, they can do so without having to alter the application, said Lane Jorgensen, manager of printer system marketing at the U.S Marketing and Services Group.

Both printers are direct channel-attach units and work with IBM 4341, 4361, 4381, 3081, 3090 and 9370 systems running MVS or VSE operating systems.

Band technology

The impact printers — including the IBM 6262 — use band printing technology and were designed for use in both direct channel attachment or distributed environments, Jorgensen said. Both can print on multipart forms, card stock, gummed labels and other special forms and feature a swing gate for easier paper loading.

The 6262 comes in two versions: the Model 12 and the Model 14, which are 1,200 and 1,400 line/min units, respectively.

The Model 14 can be directly connected to IBM 4361, 4381, 3090 and 9370 processors.

For distributed environments, both printers can attach to 9370 and 4361 units or any 3274 controller via coaxial cable and to an IBM System/36 or 38 by means of twinaxial cable.

Model 12 lists for $22,600 and is set to be available in March. The Model 14, priced at $26,500, will ship in July, IBM said.

The Model 12's price represents a 30% savings over that of the 4545, IBM's current intermediate-speed impact printer, Jorgensen said.

The 9-sq-ft printers operate at between 55 and 58db and are compact and quiet enough to be installed in an office, IBM's Wilson said. "They're so quiet that we have installed a blinking light so operators know when they are operating," he said.

AT&T option allows routing of digital lines

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — AT&T last week announced its long-expected Subrate Data Multiplexing (SDM) option, which is said to handle the firm's individual Dataphone Digital Service (DDS) channels ranging in speed from 2,400 to 9.6K bit/sec., combining them into higher speed T1 circuits and routing them to different customer sites.

The option has long been requested by AT&T customers, "who are always looking to affect their telecommunications bottom line," said AT&T DDS product manager Tom Ball.

The option can save users money by allowing them to route DDS subchannels through an AT&T service node, as opposed to connecting sites directly over individual lines leased from the local carrier, said Thomas Nolle, president of Haddonfield, N.J., consulting company CIMI Corp.

For example, instead of having point-to-point connections between remote sites in New York and Detroit and a data center in Chicago, all transmissions would go directly to an AT&T SDM service node that would then send them on to the appropriate site. This effectively halves the number of local access charges each site pays, since it is sending to one AT&T node instead of to two other sites, and also lowers long-distance charges, since it eliminates the direct Chicago-to-New York connection, Ball said.

SDM can also save users money by combining low-user transmissions into a 56K bit/sec. DDS line or into increments of 1.5M bit/sec. over an Accunet T1.5 or T45 service connection, AT&T said.

An SDM standard?

AT&T's introduction of a long-distance SDM service could also act as an incentive to telecommunications equipment manufacturers to support AT&T's SDM specification as an industry standard, Nolle said.

Avanti Communications Corp., a Newport, R.I., telecommunications equipment vendor, already supports AT&T's SDM protocol in its T1 switches and network concentrators, according to George Kushin, the firm's vice-president of marketing. The debut should put pressure on divested Bell operating companies, some of which offer local routing of SDM subchannels, by giving users a way to bypass their services, Kushin indicated.

SDM5 connects up to five subrate channels, each with a maximum speed of up to 9.6K bit/sec., at $175 per month; the SDM10 connects up to 10 channels, each with a maximum speed of 4.8K bit/sec., at $125 per month. SDM20 connects up to 20 2,400 bit/sec. channels at $75 per month.

The service is slated to be available in 20 cities by March 20, with expansion planned for later this year.

Users seek voice with ISDN forum

Charter aimed at incorporating users' needs into applications

BY ELISABETH HORWITT
CW STAFF

GAITHERSBURG, Md. — Users may finally get a chance to tell vendors what types of Integrated Services Digital Network (ISDN) applications they would like to see, through the newly formed North American ISDN User's Forum.

The forum's charter, signed here by the seven founding members last Wednesday, defines two separate bodies: the ISDN User Workshop, which will identify and prioritize ISDN applications, and the ISDN Implementation Workshop, whose vendor and carrier members will try to reach a consensus on how those applications can be implemented.

By formalizing vendor cooperation and user input, the forum hopes to ensure not only that applications reflect user needs but also that different vendors' implementations can communicate over an ISDN link, according to W. Edward Hodgson, a Westinghouse Electric Corp. communications manager.

Hodgson will chair the User Workshop and act as representative for the Association of Data Communications Users (ADCU).

Hodgson said he has been "pounding on the table" trying to get other Fortune 500 companies and users groups besides ADCU to get involved in the forum. "I keep hearing arguments like, 'My company doesn't want to spend the time or the money.' But in two to five years, standards will save a lot of both."

No pie in the sky

Once users gain a voice through the forum, Hodgson said he expects them to ask vendors not for blue-sky applications but for solutions to existing problems, "like an ISDN service to support electronic funds transfer for mom-and-pop grocery stores and gas stations," he said.

> "IN TWO to five years, standards will save a lot of [time and money]."
>
> W. EDWARD HODGSON
> WESTINGHOUSE
> ELECTRIC CORP.

While the forum may help to ensure that ISDN applications turn out to be what users want, it will probably take at least two or three years for users to have any real power in the ISDN development process, said Frank Dzubeck, president of Washington, D.C.-based consulting firm Communications Network Architects, Inc.

"No one understands what ISDN applications will be yet. I've talked to corporate users, and so far, ISDN services are just plain vanilla," he said.

The idea of the forum started with the National Bureau of Standards (NBS) soliciting people's views on how ISDN could be brought more quickly to market, according to Ken Goodgold, area manager for advanced technology at regional holding company Southwestern Bell Corp.

The NBS, an organization that helps coordinate and promote the development of standards for government organizations, will act as forum facilitator.

The forum is billed as a joint venture for both government and private industry sectors, Goodgold said.

Intimate partners

The seven founding forum members are the ADCU, Bell Communications Research Corp., European computer vendor International Computers Ltd. and regional holding companies Nynex Corp., Bell Atlantic Corp., Ameritech and Southwestern Bell Corp.

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† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.

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	Ontario	Apr 07
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	Tampa	Mar 09
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MN	Minneapolis	Feb 24, Mar 23, Apr 26
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NC	Charlotte	Feb 10, Apr 06
	Raleigh	Mar 16
	Winston-Salem	Feb 16
NE	Omaha	Mar 31
NH	Merrimack	Mar 22
NJ	Iselin	Feb 18, Mar 10, Mar 31, Apr 21
	Princeton	Feb 24, Mar 22, Apr 19
NM	Albuquerque	Mar 22
NV	Las Vegas	Apr 21
NY	Albany	Feb 09, Mar 16
	Buffalo	Apr 13
	Long Island	Feb 17, Mar 16, Apr 13
	New York City	Mar 22, Apr 20
	Rochester	Mar 03, Apr 20
	Syracuse	Mar 08
OH	Akron	Mar 23
	Cincinnati	Feb 17, Mar 16
	Cleveland	Feb 04, Mar 10
	Columbus	Feb 02, Mar 15
OK	Oklahoma City	Mar 18
	Tulsa	Apr 14
OR	Portland	Mar 15
PA	Allentown	Mar 22
	Harrisburg	Mar 17
	Philadelphia	Feb 11, Mar 10, Apr 15
	Pittsburgh	Mar 22
	Scranton	Feb 25
	Valley Forge	Feb 18, Mar 16, Apr 21
SC	Charleston	Mar 09
	Columbia	Apr 04
	Greenville	Apr 05
TN	Knoxville	Feb 03
	Memphis	Mar 09
	Nashville	Apr 06
TX	Austin	Apr 22
	Dallas	Feb 02, Mar 08, Apr 06
	El Paso	Mar 15
	Ft. Worth	Mar 22
	Houston	Feb 18, Mar 17, Apr 28
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UT	Salt Lake City	Mar 10, Apr 12
VA	Richmond	Mar 08
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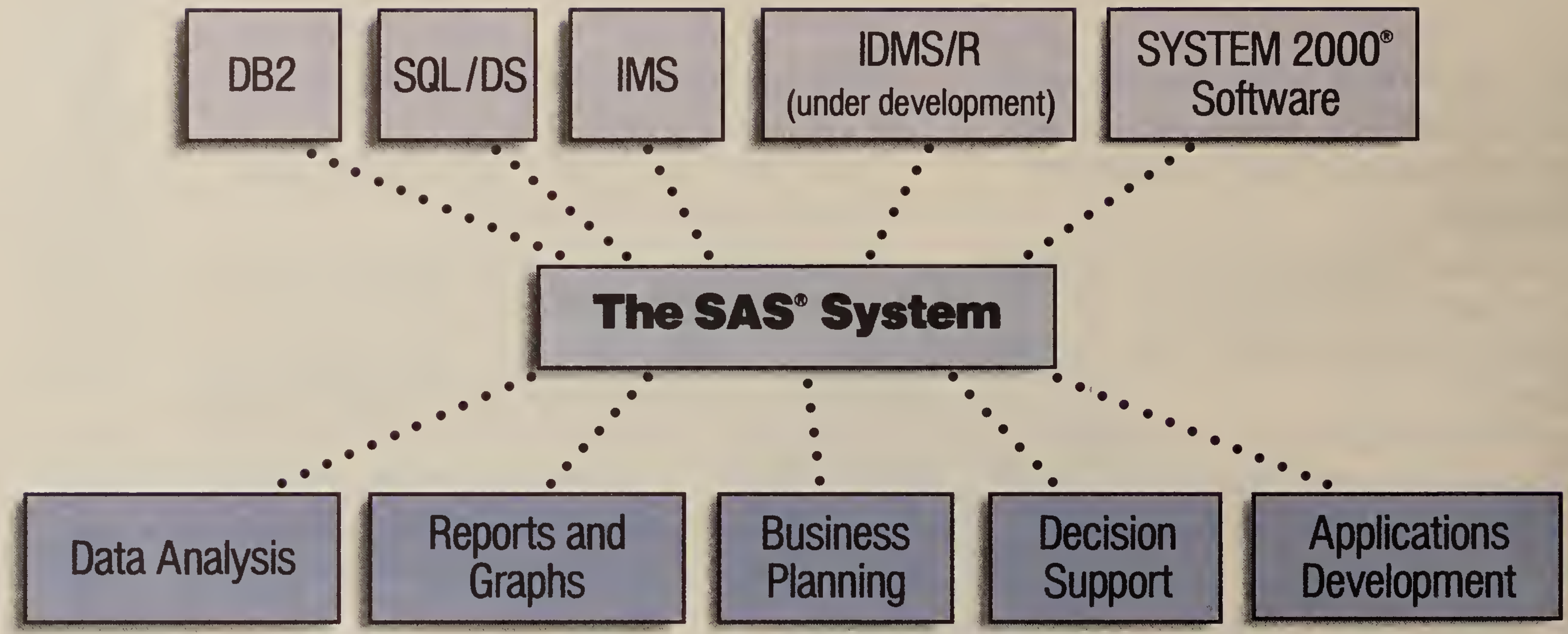

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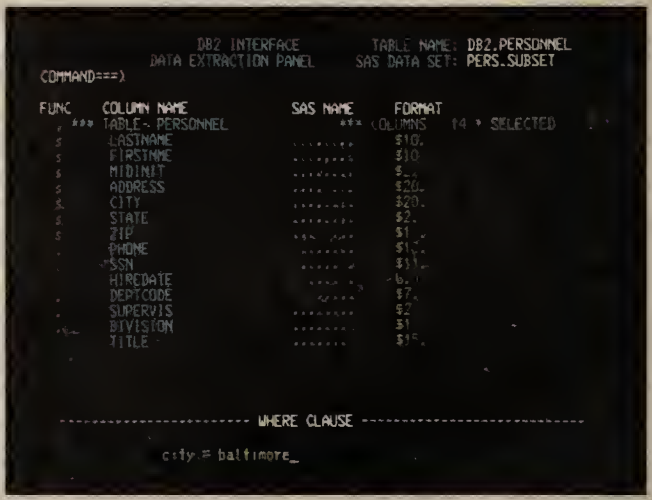

```
                   DB2 INTERFACE           TABLE NAME: DB2.PERSONNEL
              DATA EXTRACTION PANEL      SAS DATA SET: PERS.SUBSET
COMMAND===>

FUNC    COLUMN NAME                SAS NAME       FORMAT
    *** TABLE- PERSONNEL                     *** COLUMNS   14 * SELECTED
 S        LASTNAME                 ........       $10.
 S        FIRSTNME                 ........       $10
 S        MIDINIT                  ........       $1.
 S        ADDRESS                  ........       $20.
 S        CITY                     ........       $20.
 S        STATE                    ........       $2.
 S        ZIP                      ........       $1
          PHONE                    ........       $1
          SSN                      ........       $1
          HIREDATE                 ........       6.
          DEPTCODE                 ........       $7.
          SUPERVIS                 ........       $2
          DIVISION                 ........       $1
          TITLE                    ........       $15.

------------------------- WHERE CLAUSE ----------------------------

            city = baltimore_
```

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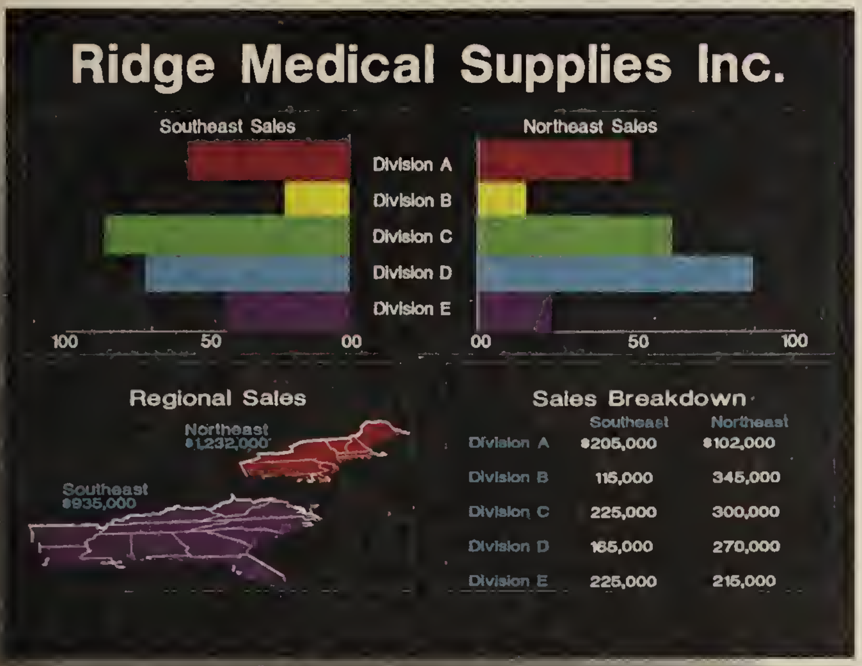
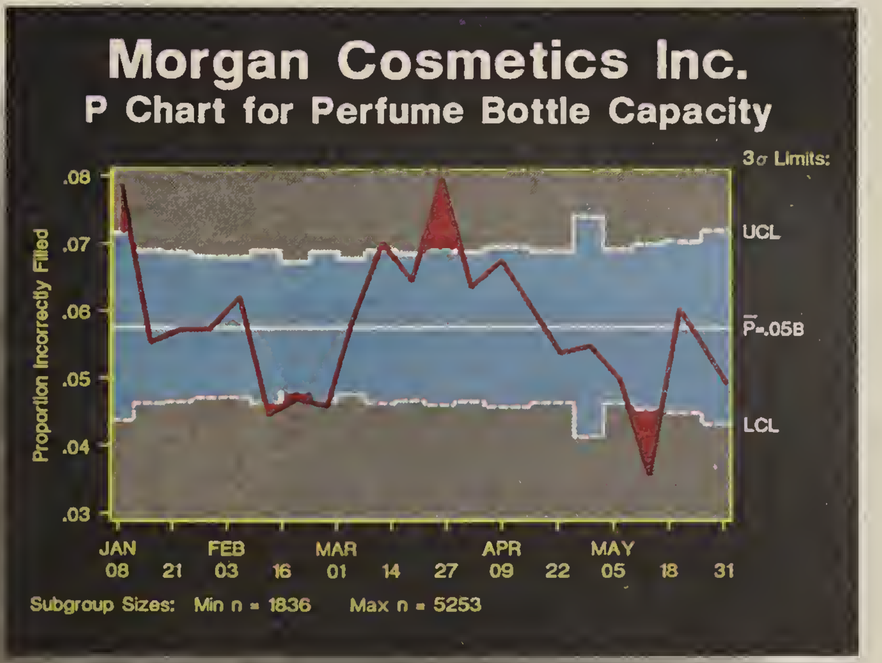

Ridge Medical Supplies Inc.

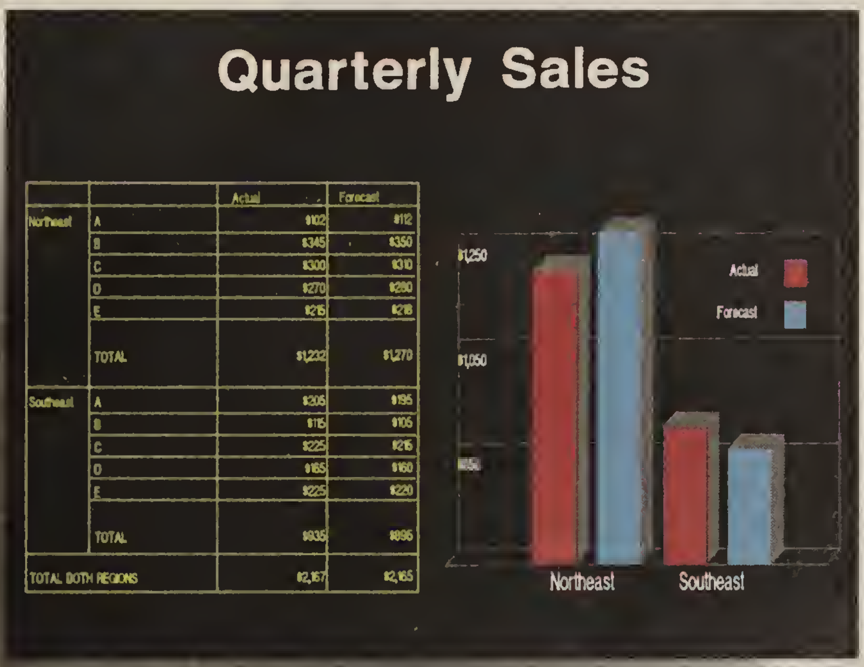
Sales Breakdown

	Southeast	Northeast
Division A	$205,000	$102,000
Division B	115,000	345,000
Division C	225,000	300,000
Division D	165,000	270,000
Division E	225,000	215,000

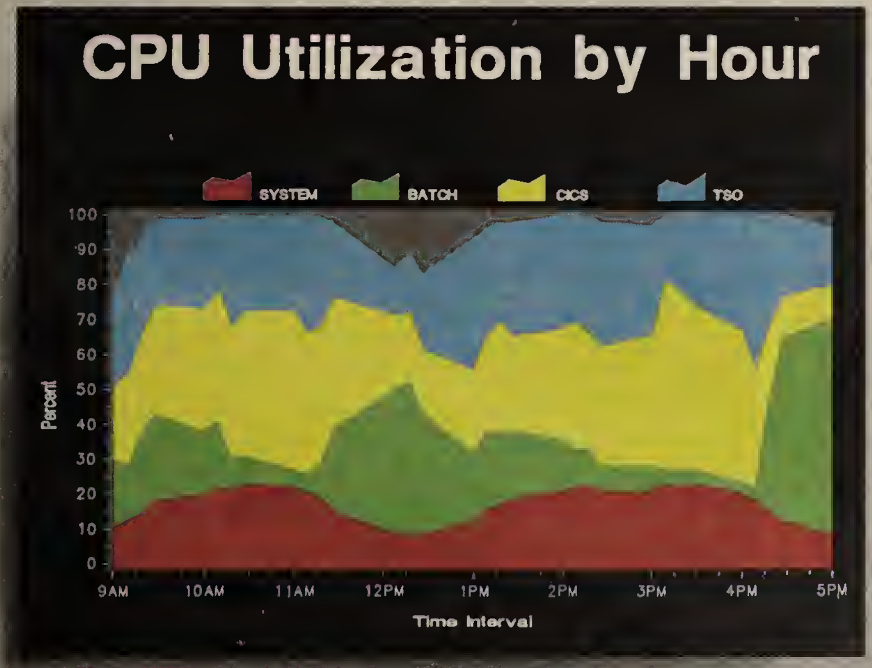

Morgan Cosmetics Inc.
P Chart for Perfume Bottle Capacity

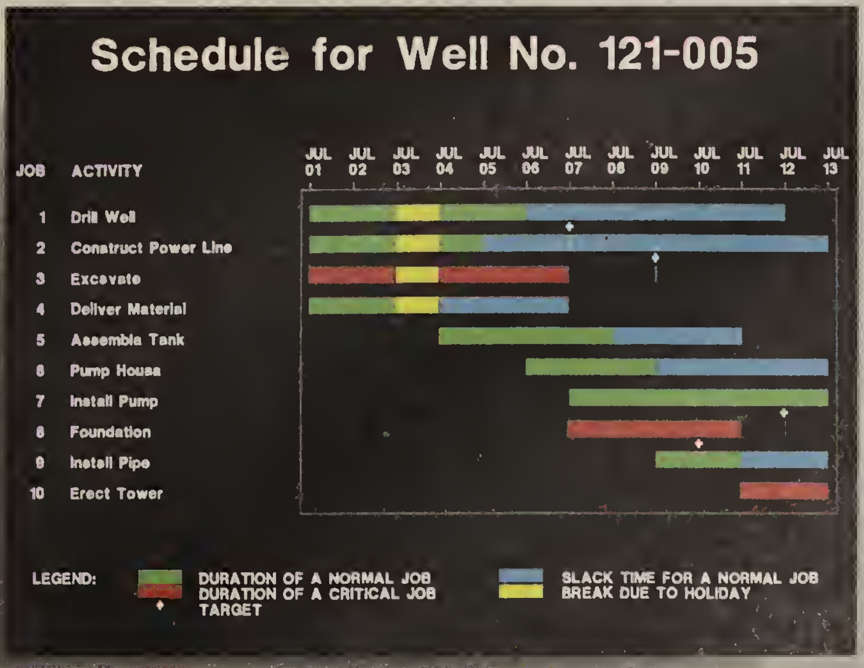
Subgroup Sizes: Min n = 1836 Max n = 5253

EMS Software International
Countries with Products Installed
As of January 1, 1987


Quarterly Sales

		Actual	Forecast
Northeast	A	$102	$112
	B	$345	$350
	C	$300	$310
	D	$270	$280
	E	$215	$218
	TOTAL	$1,232	$1,270
Southeast	A	$205	$195
	B	$115	$105
	C	$225	$215
	D	$165	$160
	E	$225	$220
	TOTAL	$935	$895
TOTAL BOTH REGIONS		$2,167	$2,165


CPU Utilization by Hour


Schedule for Well No. 121-005

JOB	ACTIVITY
1	Drill Well
2	Construct Power Line
3	Excavate
4	Deliver Material
5	Assemble Tank
6	Pump House
7	Install Pump
8	Foundation
9	Install Pipe
10	Erect Tower

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Shopping club finds a bargain

Network's voice response system answers one million calls a month

BY ALAN J. RYAN
CW STAFF

"Hi! This is Tootie. We are now taking orders for the four-piece necklace, earrings and key ring set."

For television junkies and mail-order aficionados, the voice of Tootie might be akin to heaven on earth. Shoppers can order merchandise ranging from personal computers to faux diamonds, 24 hours a day, 364 days a year from home while watching the Home Shopping Club.

The Home Shopping Network *brought in $582.1 million in sales in 1987*

Tootie answers each incoming call to the Home Shopping Club — a number that can climb to hundreds or even thousands per minute. She either handles the order herself or passes the call on to another operator. It is no secret that she is considered an extremely efficient worker: She works day and night, takes no coffee breaks or vacations and voices no complaints about being left off the company's payroll. She is not programmed to complain.

The voice response system nicknamed Tootie handles some one million calls monthly for the shopping club, more than one-third of the club's total monthly calls, according to Woody Boyd, president of Precision Software, Inc., the developer of Tootie and similar systems.

The Home Shopping Club learned of Precision Software's technology through its Unisys Corp. marketing representative, Boyd explains. In November 1986, Precision Software presented an analysis to the club and was quickly awarded a contract for the voice response system. Less than a year later, the mammoth Home Shopping Network, parent of the club, acquired the software firm.

The Home Shopping Network recorded sales of $582.1 million and earnings of $29.5 million in the year ended last August, reflecting increases of 363% in sales and 174% in earnings over the prior year.

The television-based shopping program is available to 43 million homes across the U.S. on cable and broadcast TV stations and through satellite dish broadcasts. During fiscal 1987, the program shipped 17 million packages, compared with 4.9 million in fiscal 1986.

Tootie steals the show

The network employs more than 4,400 people, but its shining star is the voice response system.

For approximately $3,000 per phone line, network users of Precision Software's voice response technology receive one or more IBM Personal Computer ATs or compatibles, depending on the size of the installation. The computer acts as a series of telephones would to a phone system. "You could unplug the phone on your desk and plug in the unit," Boyd says.

The maximum number of phone lines per micro is 64, Boyd says. The system also comes with applications to address user needs like home banking and trucking dispatching.

At the Home Shopping Club, each microcomputer in use has the equivalent of 24 voice positions on it, according to Jerry Troupe, executive assistant to the chairman of the board for special projects.

Troupe explains that in the main location, there is a network of 28 PCs offering the equivalent of 670 agent positions. In a remote facility in Clearwater, Fla., there are two more computers that create another 40 agent positions.

WITH the operators and Tootie combined, 2,000 or more calls can be handled per minute during peak periods.

The club works like this: An item is brought out to the podium and displayed for the home audience; then the order taking begins. Order taking occurs only while the item is on display.

Limited time only

Because the items being sold are all in-stock inventoried items at the Home Shopping Network warehouse, orders are taken until the inventory has been depleted. The show host can view a window indicating the number of calls being taken by Tootie at any time. That information cues the host as to when items should be rotated. A typical item remains on display for approximately six minutes, Troupe says.

With the operators and Tootie combined, 2,000 or more calls can be handled per minute during peak periods with heavy-volume items.

Callers to the voice response system become computer users, and their Touch-Tone telephones act as the computer, Boyd says. "The difference is that the user communicates with the sense of sound rather than the sense of sight," as he would on a computer terminal screen, he adds.

"Every phone call that comes into the building on an 800 line is routed to a voice response line before it has the opportunity to go to a human operator," Troupe explains. The caller can either place an order with the voice system, punching in a membership number from previous orders, or punch in 0 to contact the human operator.

All information about a customer is kept on a data base on the Home Shopping Club's Unisys A 15J mainframe, so repeat callers can make purchases without having to repeat credit card numbers and address information each time.

Operators on duty

During peak periods, the company employs up to 1,200 operators in each of its two locations. The locations are connected via a fiber-optic link.

Advantages the voice response system offers the Home Shopping Club include the ability to move more merchandise in addition to labor, space, time and phone-line savings, Troupe says.

According to Boyd, the voice system is fast. "The average length of call for a human operator is between 50% and 100% longer," he says. "Tootie has reduced significantly the call length," he adds, allowing more products to be sold faster.

Apollo launches Domain/OS

CHELMSFORD, Mass. — Apollo Computer, Inc. last week rolled out a version of its Unix operating system that it said incorporates building blocks for distributed computing.

Domain/OS uses Apollo's Network Computing System (NCS) architecture, which the company introduced a year ago as a method to spread applications across computing systems on a network.

To achieve distributed computing, users need the NCS tool kit in addition to Domain/OS to split up applications and assign them to different resources on the network. Domain/OS is not required to build NCS applications.

The operating system is scheduled for mid-year shipment. Apollo bundles the system with its workstations and does not price it separately. When Apollo users add systems to a Domain network, they are charged a fee for the additional media and documentation required for the operating system, which ranges in price from $200 to $500, a company spokesman said.

Three-faceted base

Domain/OS is based on three operating systems: Apollo's Aegis, a proprietary operating system; AT&T's Unix System V, Release 3; and the University of California at Berkeley's Unix 4.3.

Users of Apollo's current Unix offering, Domain/IX, will receive support for at least another year, the company said. Users will be charged a fee for media and documentation, the price of which has not yet been determined but should be in the $200 to $500 range, the company added.

The new operating system incorporates three NCS facilities: a distributed registry, a network print manager and a remote debugger.

IBM to deliver 9370s to U.S. Postal Service

BY JAMES CONNOLLY
CW STAFF

WASHINGTON, D.C. — IBM's oft-criticized 9370 mid-range system last week won one of the major contracts IBM had anticipated when the U.S. Postal Service awarded the company a pact for at least 306 — and possibly more than 900 — 9370s and larger IBM 4381s.

IBM defeated Digital Equipment Corp. and AT&T in the final bid competition. Under the three- to five-year contract, IBM will supply the Postal Service with 306 VM-based systems to run an integrated logistics support system at regional post offices. IBM bid 9370s and 4381s, although most of the initial 306 sites will get 9370s.

Since the 9370 was introduced in October 1986, IBM has said it expected to win several contracts for hundreds of systems. Recent criticisms of the 9370 have been based on the reluctance of large organizations to buy the system. Analysts estimate that IBM sold 3,000 to 4,000 of the minicomputers in 1987, rather than the 5,000 IBM once projected.

More demand likely

The Postal Service request for proposals stated that the number of systems needed could reach 904 as other applications and locations are supported.

According to Rick Weirich, director of the Postal Service Office for Communication and Technology, the requirements contract is an open-ended agreement that standardizes the service's distributed systems needs as defined by the logistics support system application. That system was designed to integrate tasks now done manually or with a combination of personal computers and mainframes.

Weirich said the application will help regional managers coordinate with each other and with Postal Service headquarters and will save money on volume equipment and materials procurements, shifting inventories to locations in which they are needed and making maintenance efficient.

Judges' decisions final

He said that during a lengthy review process, all three finalists demonstrated systems that met the Postal Service's needs.

Those needs included a single operating system and the ability to support a broad range of terminals. Individual systems may support between two and 512 users.

"Our requirement was for a platform that we could deploy in all our facilities, which come in a wide variety of sizes," Weirich said.

CDC ready to unveil native Unix for Cybers

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Control Data Corp. plans to announce a native Unix operating system for its Cyber line of mainframes at this week's Uniforum meeting in Dallas.

The modified version of AT&T's Unix System V, which will have a 64-bit addressing scheme to match the Cyber architecture, will be available for sale sometime next year, CDC executives said last week.

The move to bring standard Unix applications to Cyber systems was requested by CDC users. Normally, Cyber machines are packaged with CDC's proprietary 64-bit NOS/VE operating system. Until now, only a limited form of Unix compatibility had been provided through a shell called VX/VE, according to John Wardell, a manager in CDC's strategic marketing group.

The new Unix system, developed by an unnamed outside company, should be compatible with the government's Posix standard. However, off-the-shelf Unix System V applications will have to be recompiled to run in CDC's native 64-bit environment, Wardell said.

The addition of native Unix should not be interpreted as a divergence from NOS/VE, said Sharon Studer, manager of strategic marketing for CDC's computer systems group. "This is absolutely not a move away from NOS/VE," she said. "In a production environment, NOS/VE gives large, complex computer sites a level of security, fault tolerance and high-performance I/O not provided by Unix."

However, most of the estimated 1,300 Cyber sites run the original NOS operating system instead of the newer NOS/VE, CDC managers said.

Catering to old and new

An internal survey of CDC user sites showed that Unix was a growing requirement for both established CDC users and new prospects. One reason for Unix's appeal is its multitasking capability, Wardell said.

"We see this as an opportunity to gain new-name accounts," Studer said. Packaged with the Cyber 930 departmental system, standard Unix applications will round out CDC's software offerings in the engineering and scientific areas, she said. "To the extent that Unix has become acceptable in other environments, this move would open new application areas to us, such as office applications." The company is moving to strengthen its ties with third-party providers of Unix applications, she added.

The Cyber version of Unix should complement another version being prepared to run on CDC subsidiary ETA Systems, Inc.'s ETA-10 supercomputer. The ETA-10 Unix version is set for release later this year.

Eventually, CDC users should see what the company calls "the transparent environment." That environment would start at a desktop Unix workstation and reach up to the largest Cyber mainframes and ETA-10 supers.

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Uniforum focus on 'serious' side

BY ROSEMARY HAMILTON
and JULIE PITTA
CW STAFF

DALLAS — There may be few product surprises, but the big guns of the industry will show their commitment to Unix this week at Uniforum, scheduled to open tomorrow.

Apple Computer, Inc., IBM, AT&T and dozens of other vendors plan to make announcements. Noticeably absent from this roster is Digital Equipment Corp., which is scheduled to offer only an exhibit.

"There will be a lot less razzle-dazzle this year," said David Fiedler, editor of "Unique," a Unix newsletter published by Infopro Systems. "People are getting more serious and less innovative about Unix."

High hopes for Apple

This week's biggest splash is expected from Apple, which plans to roll out AUX, its long-awaited version of Unix. AUX is an Apple-ized version of AT&T's Unix System V, Release 2, with extensions from the University of California at Berkeley's Unix 4.2. Sources said 100,000 copies of Apple's long-awaited AUX were recently shipped.

Formally introduced last spring with the debut of the Macintosh SE and Macintosh II microcomputers, AUX was originally scheduled to ship last July. However, problems in tuning the operating system, designed for the Motorola, Inc. 68020-based Mac II, delayed its release. The ship date for AUX was amended several times before this week's expected release.

Pricing will be announced at the Uniforum conference.

AT&T will reportedly announce plans for Release 4 of Unix System V. The company is also set to demonstrate for the first time the operating system that merges Microsoft Corp.'s Xenix and Unix System V.

AT&T also plans a joint announcement with Amdahl Corp. and Sun Microsystems, Inc. Industry observers speculated that the trio may disclose plans for developing a mainframe version of Unix that incorporates some features of the Berkeley version, on which the Sun operating system is based.

One consultant said he expects the group to announce plans to hook Sun workstations into the Amdahl environment.

IBM has scheduled a press conference for Tuesday to reveal enhancements for what the company now calls its AIX workstation family. This line includes both the RT Personal Computer and the Personal System/2 Model 80 running AIX.

A company spokesman said no RT PCs or PS/2s will be introduced. William Lowe, president of IBM's Entry Systems Division, will be on hand to help people understand the relationship between the RT and PS/2, the spokesman said.

The announcement "will likely be a bridge between the RT and PS/2," said Judith Hurwitz, senior editor of "Unix in the Office," a publication of Patricia Seybold's Office Computing Group. "That has been their announced strategy."

Data bases in on the act

The three major data base vendors in the Unix market have also scheduled announcements.

Relational Technology, Inc. hopes to jump on the bandwagon for connectivity between Apple and DEC computers with a port of its Ingres relational data base management system for the Macintosh II.

The DBMS will reportedly run under the Apple's AUX. Claiming to take advantage of increased connectivity between DEC VAXs and Mac workstations, Relational said the product will help provide a link between the Mac II and distributed computing environments.

Oracle Corp. will announce a deal with Intellicorp to remarket the latter company's artificial intelligence tools. Oracle said it also plans to work with Intellicorp to develop an intelligent front end to its DBMS.

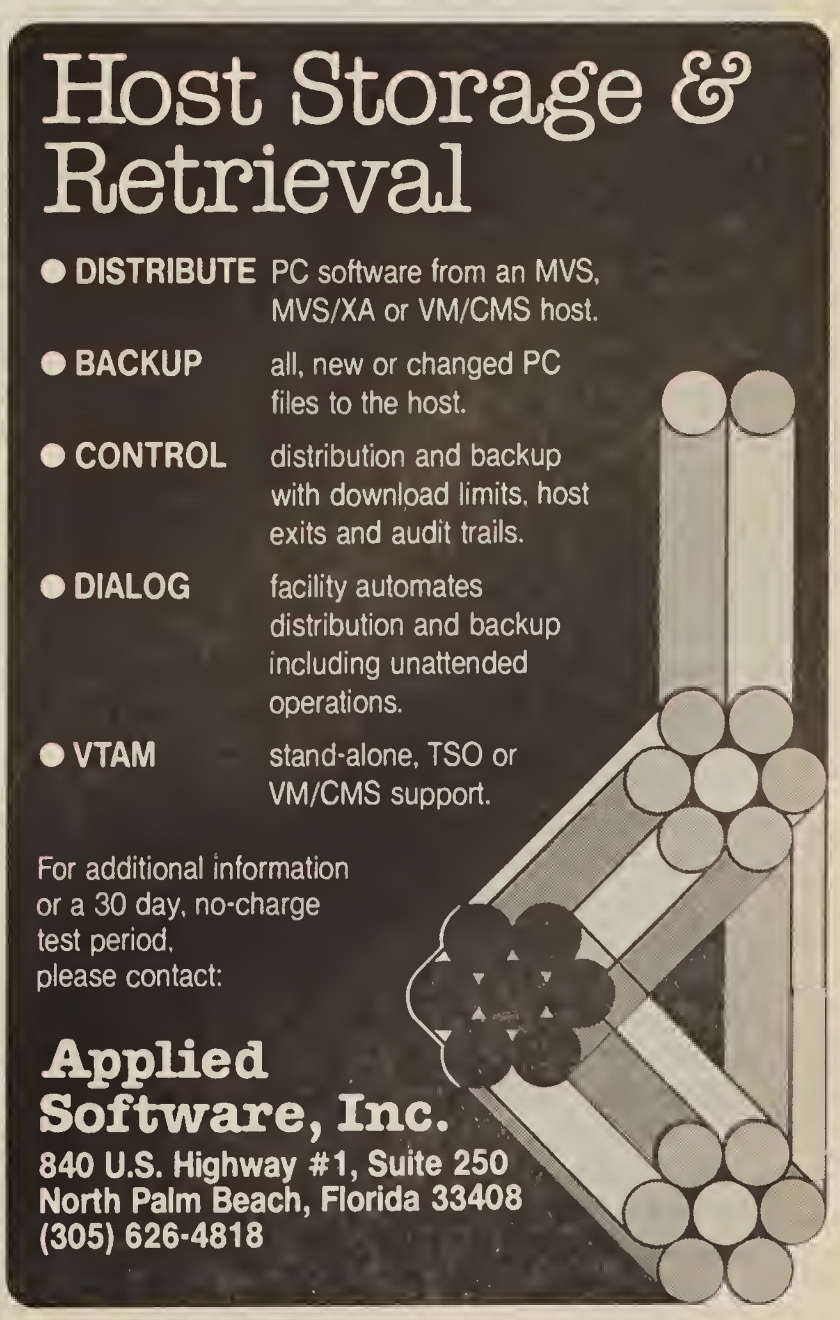
Informix Software, Inc. is scheduled to unveil Informix-Turbo, a data base server that it said is fault-tolerant because it ensures that data will not be lost in the event of a system crash.

Unisys Corp. is slated to unveil two Unix-based product lines, the U 5000 series of workstations and the U 7000 series of superminicomputers, which reportedly will support up to 348 users. Both lines will run under a version of AT&T's Unix System V, Release 2.

Hewlett-Packard Co. plans to introduce a CPU upgrade for its HP 9000 Model 825S and 825SRX workstations, which are based on the company's reduced instruction set computing architecture. The company claimed the upgrade, which costs $10,000, will make the workstations 75% faster than the Sun-4/260 and Silicon Graphics, Inc.'s Iris 4D/70.

Wyse Technology is set to announce a marketing agreement with The Santa Cruz Operation, Inc. under which Wyse may resell SCO Xenix 386 for the next three years. Priced at $695, a co-labeled version of SCO Xenix 386 will be sold to Wyse resellers separate from Wyse's Intel Corp. 80386-based micros.

West Coast correspondent Stephen Jones contributed to this report.



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EDITORIAL

A bitter pill

FIVE YEARS AGO TODAY, IBM announced its plan to end a 20-year-old practice of distributing source code with its software licenses, thus moving toward an object-code only policy.

The policy change ignited fires all over the map, stoked in great measure by third-party vendors that saw the change as a direct threat to their existence.

Today, this highly complex and emotionally charged issue continues to defy the adage that time heals all wounds. As *Computerworld's* In Depth face-off (see story page 55) between parties on both sides shows, the object-code only policy continues to foster a divisive, bitter struggle between IBM and third-party software providers. Both sides are aggressively trying to win over the group that will ultimately determine what shape the policy will take — the users. From the free enterprise viewpoint, IBM has every right to protect its significant investment in systems software development with weapons like object-code only. Giving the code away clearly gives IBM's competitors an advantage they would not otherwise have. Doing so, therefore, is clearly not in IBM's best interest.

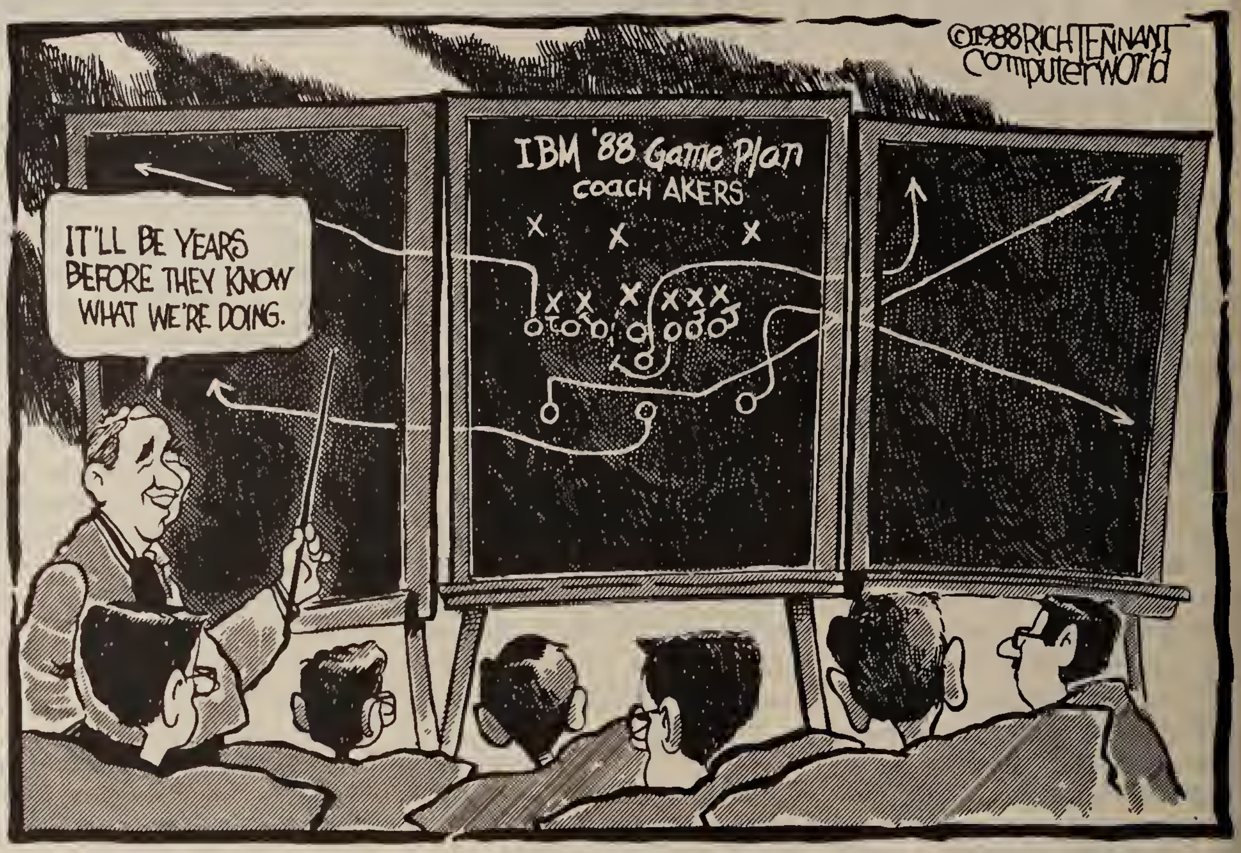
Furthermore, MVS and other users in heavy production-oriented environments have had few complaints and actually some praise about the policy. By effectively controlling the systems environment, IBM can limit modifications to its programs, imposing greater uniformity on the environment and simplifying the support task.

But there is another view. IBM's de facto monopoly in the mainframe operating systems area — while in one sense no different from the position of Unisys, DEC and others vis-a-vis their operating systems — gives it the ability to name the tune for third-party developers to a greater extent than any other company. Seen this way, IBM's present-day position in operating software demands special consideration to promote competition, which is the one area that all parties must agree is in everyone's best interest.

At *Computerworld,* we have always taken the position that what is best for the user is best — period. Some users, particularly those in the more interactive, less production-oriented VM environments, have voiced concern about the object-code only policy, but not vociferously. It appears that IBM has been quick to respond to specific user problems, and that has quelled any potential fury. IBM claims it has responded similarly to third-party vendors, although some vendors tell a different story.

Third-party vendors with product lines closely tied to IBM source code have suffered, and they have also begun making adjustments. Does this mean these companies are slowly vacating markets IBM would like to dominate?

If the policy ultimately serves as a force to reduce competition, it is clearly wrong, if not illegal. But in the absence of either court challenges or a user uprising to the object-code only policy, reality becomes a bitter pill that third parties may have to swallow.



LETTERS TO THE EDITOR

What's in a title?

I enjoyed the article about chief information officers [CW, Dec. 28, 1987/Jan. 4, 1988]. I agree with the analogy that the title is not important as long as the need is recognized.

Ron Brezezenski and I participated in a CIO panel discussion in June 1987 at the National Computer Conference in Chicago. We both agreed that CIO is a bad title and indicates there is not parity with our peers. As long as information systems play a strategic role in the business, titles are irrelevant.

Walter C. Zerrenner
Vice-President
Information Systems
Evangelical Services Corp.
Oak Brook, Ill.

ISDN special

Congratulations to McDonald's Corp. Integrated Services Digital Network (ISDN), the McNugget of technology, marches on [CW, Jan. 18, 1988].

In celebration of the monumental leap forward from 100 to 400 ISDN lines, we suggest McDonald's consider offering an ISDN special, where 2B + D gets you two burgers and a drink. Like ISDN services, pricing has not yet been finalized.

John J. Powers
Geoffrey C. Tritsch
Principals
Powers Tritsch &
Associates, Inc.
Wellesley Hills, Mass.

Reminiscing

John Kirkley's request for information on the old Dick Tracy comic strip [CW, Nov. 2, 1987] brought back some interesting memories.

I believe that he may find what he is looking for if the *Chicago Tribune* has kept files of its Sunday comics dating back to the mid-1960s. If my memory serves me right, the series featured the entire Plenty family, which included Sparkle and B. O., and involved lunar landings with extraterrestrial contacts and intermarriage — with offspring. The interplanetary ships were magnetically driven and looked like large cans with gooseneck lamps attached to the ends.

I hope this helps in his search. Thank you for reviving some pleasant memories.

Marcus P. Hagen
DHC Industries, Inc.
Eldora, Ind.

This week in history

Feb. 6, 1978
Honeywell Information Systems, Inc. expands its Level 66 family with the Level 66/Distributed Processing System said to roughly cover the performance of IBM's 3031, 3032 and 3033.

At the same time, Honeywell denies that the system's introduction signals the demise of the troubled Level 66/85.

Feb. 7, 1983
A National Science Foundation panel calls for a federally coordinated national program to stimulate U.S. development and use of supercomputers. The 15-member panel of scientists warns that large-scale computing in the U.S. may be eclipsed by Japanese research and development efforts by the end of the decade.

Out of focus

I resent Harvey Newquist's column about the Strategic Defense Initiative [CW, Nov. 30, 1987], partially because I bought *Computerworld* to read about computers and not about washing machine problems. I also resent the self-proclaimed experts using errored facts and misleading logic to defeat the effort to replace Mutual Assured Destruction with a defense system.

Please keep CW focused on computers. Let Newquist shoot at things he does not really understand elsewhere.

Milo L. Hurley Jr.
Denver

Making it clear

Recent articles in *Computerworld* [CW, Nov. 30, 1987; Dec. 7, 1987] alleged that the National Bureau of Standards (NBS) had provided a special service to IBM by secretly testing a compiler. This was not the case.

Identification of compilers scheduled for testing is offered as a service to vendors. The NBS procedures allow vendors to request that the scheduling of a compiler validation not be published in the Certified Compiler List, as was stated in "NBS ad-

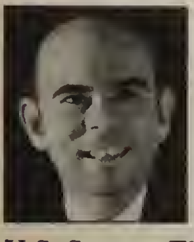
Continued on page 18

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Long arm of the law

Systems pros: be wary of computer crime laws

BUCK BLOOMBECKER



Eleven years ago, Connecticut Sen. Abraham Ribicoff introduced the first computer crime bill in the U.S. Senate. The bill went down in defeat, as did all other attempts at similar federal legislation until 1984. But its effects have since been felt in dozens of states that have copied its language.

Since 1984, Congress has strengthened the federal computer crime law, passed the Electronic Communications Privacy Act and, most recently, passed H.R. 145, the Computer Security Act of 1987. H.R. 145 could ultimately affect computer security professionals more than all the earlier laws combined have.

> UNDER SOME of these laws, if you were involved in the design, implementation or use of a disapproved computer application, you might be liable.

This law makes periodic computer security training mandatory for operators of sensitive federal computer systems. It requires that every operator of a sensitive system establish a plan to ensure the security and privacy of the systems under his control.

If followed, this law will set a precedent that could significantly influence information management in the private, as well as the public, sector and at all levels of government. It is just one sign of the legislative interest in computer crime that Ribicoff initiated more than a decade ago.

Entertaining legislation

At the beginning of 1987, 47 states had passed some kind of computer crime law. A modification of Parkinson's law is required to explain why 15 more computer crime bills were introduced before the year ended: The quantity of new legislation introduced in an area is directly proportional to the amount of old legislation existing in the same area.

This relationship may seem bizarre to the systems professional, who might logically assume that once a state passes a law, it lessens the need to deal with the same problem again. But it will make perfect sense to a television viewer accustomed to seeing "new" programs imitate old ones far more frequently than they strike out for virgin territory.

Like entertainment, legislation is often the result of what people are paying attention to, not what they need.

Currently, people are paying attention to the regular reports of computer crime with which the media entertains us. People who used to gossip about the Asian flu now ask about IBM's viruses.

In the public eye

The democratization of computer crime is gaining speed. Voters are becoming increasingly comfortable forming opinions about computers, and computer crime law seems to be the arena in which many of their negative opinions are being expressed.

The introduction of 15 pieces of legislation last year suggests that many lawmakers see computer crime as an issue of concern to their constituents. The passage of seven bills into law suggests that those lawmakers are right.

Three states — California, Illinois and Missouri — undertook the complete rewriting of their laws. In each case, the laws' proponents argued that the existing laws had been outstripped by the march of technology and criminal inventiveness. (In none of these cases, so far as I can tell, was there much hard evidence to support the argument.)

Three other laws, in New Mexico, North Dakota and Oregon, all reflected growing sophistication regarding the varied nature of computer crime threats.

Each of these latter three states raised the possible maximum penalty for a crime, reflecting the easy legislator's reaction to any problem: tougher laws. (Again, no evidence was brought forth that more toughness was needed, but rhetoric seemed adequate to carry the day.)

Hackers get slap on wrist

At the same time, several of the laws passed last year also reduced the minimum penalties for computer crime offenders. This change, I believe, reflects the continued public interest in hacking.

When there is little or no damage to a computer system, juries are unlikely to allow the perpetrators to be punished severely, particularly if they are

Continued on page 18

BloomBecker is director of the National Center for Computer Crime Data in Los Angeles.

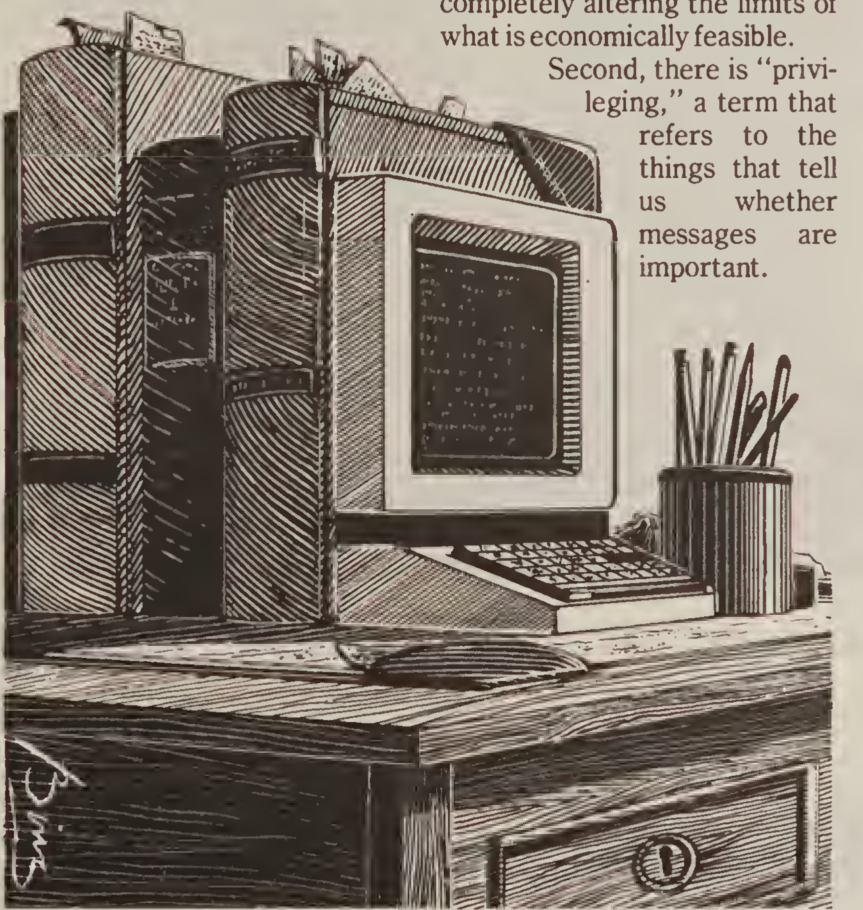
Is it official, or is it junk mail? Desktop publishing won't tell

JOHN BARNES

In predicting the future, it is important to remember that major technological advances are often less important than advances made in the use and application of technologies. It often takes longer to find out what a thing is good for than it originally took to invent the thing itself.

When a technology really shakes things up in a big way, it doesn't change how just one thing is done; it alters a whole set of parameters governing the way the universe works.

For example, the automobile made a bigger impact on our society than the blender did, because the blender simply changed the way we chop up our food, whereas the automobile completely redefined our social geography.



CHRISTOPHER BING

On the spectrum of change making, desktop publishing is a lot closer to the automobile than it is to the blender.

Changing the universe

Just as the telephone altered the whole way we communicate and as the automobile altered the whole meaning of physical space, desktop publishing is changing basic properties of the social and business universe.

First, there are economies of scale in publishing. Until now, publishing has faced high fixed costs (presses and plates cost a lot) and low marginal costs (once you're set up, making one more copy is cheap).

Thus, the cost difference between putting out a newsletter and not putting one out at all was much bigger than the difference between printing 8,000 copies and printing 8,100 copies of it.

The whole institutional structure of the publishing industry reflects this fact — you buy magazines instead of just the individual articles you want; you buy the whole manual and not just the parts you need.

Desktop publishing drastically shifts the relationship between fixed and marginal costs, completely altering the limits of what is economically feasible.

Second, there is "privileging," a term that refers to the things that tell us whether messages are important.

The way in which we distinguish junk mail from genuine business correspondence is one example. Another is a painting that hangs in a gallery; it conveys more privilege than one sitting on a street artist's easel.

Throughout the last century or more, good quality printing and layout have been the major part of the privileging of the printed word.

We tend to take lower quality printed material, such as Communist Party booklets, less seriously because we can tell at a glance that the people who put the material out can't afford access to good printing.

Once again, desktop publishing will change the scene dramatically.

Many large corporations are already plagued with internal underground newsletters and unauthorized memos.

How much bigger will the problem be when it becomes impossible to tell what is and isn't official?

A look ahead

What will the big shifts brought on by desktop publishing mean? Let me stick my neck out a little here.

Within five years: Crises will occur in corporate discipline as very large quantities of information begin to flow across, instead of through, the lines of authority. Many more employees will know a lot more about the company — and not always what management wants them to know.

There will be thousands of new narrow-interest publications, especially scholarly, literary and trade issues.

Newspapers and other publications will achieve national distribution entirely by modem to local news vendors.

Potentially, there will be hundreds of competitors in a market that today is held by only five or six national newspapers.

Within 10 years: Bookstores and libraries will be able to print any book while you wait for less than half the current cost of a new book. But if you want a hardback, you'll have to take it to a bookbinder yourself.

"Checklist cookbooks" will meet individual interests and dietetic needs: *North Italian Low Sodium Meals with Preparation Times of Less than Thirty Minutes for a Family of Six*, if that's what you want.

The production quality of everything printed will rapidly improve as layout and design skills disperse through the population. Graphics and text design courses will be offered in high schools, much as typing and word processing are now.

Within 15 years: We'll be receiving catalogs from designers, rather than the manufacturers, of furniture, clothing, jewelry, shoes — anything a local craftsman can make from a pattern.

Patterns will be modified to whatever size and fit desired and then either mailed or transmitted via modem to local craftsmen.

Major authors will be self-publishing through the same channels as the modem newspapers, thus bypassing publish-

Continued on page 18

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was published by Congdon & Weed. His second novel, *Sin of Origin*, will be published this spring.

Law

CONTINUED FROM PAGE 17

young, middle-class and bright.

The seventh state, Arkansas, passed its first computer crime law, leaving only two states, West Virginia and Vermont, without any legislation whatsoever on the subject. Massachusetts and Maine, which cover computer crimes only in a limited way in their current statutes, were each asked to reconsider legislation previously introduced but not passed.

Bills become picket signs

Democratization goes beyond the passage of laws. The bills that did not pass suggest that computer crime law may soon be seen as a vehicle for protest against unpopular computer uses.

California and Pennsylvania have followed the lead of proposed federal legislation in attempting to outlaw the use of computers for child pornography activities.

California has also attempted to criminalize the use of computers for advertising, selling or distributing obscene matter.

New Hampshire has attempted to prohibit computerized telephone solicitation, and Connecticut has added computers to its list of items that cannot be brought into jails without permission.

Texas and North Carolina considered bills that would have provided further protections against misuse or theft of computer programs or information.

Although none of the bills above passed, they should make computer professionals pause.

Guilt trickles down

Under some of the laws, if you were involved in the design, implementation or use of a disapproved computer application, you might be liable.

For a system that is insecure, the odds are also increasing that those who set it up or those who maintain it may be found liable.

As more and more legislative attention is directed toward computer use and abuse, those who work in the computer profession should be aware, if not wary, of the law.

Publishing

CONTINUED FROM PAGE 17

ers completely.

The last pornography laws will be repealed because they will be unenforceable.

Within 20 years: Routine facsimile service will be available in the home as well as in the office and will virtually replace mail, except for advertising material and some personal correspondence.

Large ideological hierarchies — churches and political parties, for example — will find themselves facing enormous internal pressure to decentralize. The more economically advanced Communist countries may have to exercise a de facto free press.

Global literacy will be at an all-time high in many more languages than it currently is.

Right now, one of the biggest hurdles Third World literacy programs are facing is the absence of appropriate printed matter to use for practice. Many people have to learn a second language before they can get anything to read. Imagine the difference a few billion cheap primers could make.

Finally, desktop publishing will be more commonly referred to as just "publishing." Fueled by increased literacy worldwide, the industry will still be expanding.

Making it clear

CONTINUED FROM PAGE 16

mits Cobol test rules fuzzy" [CW, Dec. 21, 1987]. However, the procedures are not as clear as they could be.

The NBS plans to clarify both the procedures and the explanation that appears in the Certified Compiler List, which announces the schedule of compiler validations.

We will make it clear that the published schedule may not list all compilers scheduled for testing and that vendors have the option of requesting that their products not appear on the schedule.

I would also like to correct a statement in "Quiet test for IBM Cobol 85" [CW, Nov. 30, 1987] that vendors wishing to bid on government contracts for compilers complying with Federal Information Processing Standard (FIPS) 21-2, Cobol, had to have a validated compiler or be scheduled for testing by Oct. 1, 1987.

There is no deadline by which compilers have to be scheduled for validation. FIPS 21-2 states that any Cobol compilers acquired for federal use after Oct. 1, 1987 must comply with one of the subsets of the standard.

Vendors may request validation of their compilers whenever they decide to sell their compiler to the federal government. All compilers that pass the tests are added to the list as validations are completed. Agencies may acquire compilers on that list as needed.

The procedures for requesting compiler validations and the Certified Compiler List are available from Room B164, Technology Building, NBS, Gaithersburg, Md. 20899. 301-975-3240.

Helen M. Wood
Deputy Director
Institute for Computer Sciences and Technology
Gaithersburg, Md.

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SOFTWARE & SERVICES

SOFT TALK

Jerrold M. Grochow

Justifying the cost of CASE

Computer-aided software engineering (CASE) technology costs a bundle. While DP management expects wide-ranging benefits from CASE, these are hard to predict and further off than most people realize. With competing budget demands, management is asking — and rightly so — how an investment in CASE can be justified.

Cost-benefit comparisons provide the common denominator, but the problem is how to prepare a case for CASE and win management approval for bringing this technology into your organization.

On the surface, analyzing the costs and benefits of CASE should be similar to studying those of any other investment. You estimate costs and benefits by time period and calculate various functions such as net present value and internal rate of return.

While constructing the cost stream is relatively easy to do, deriving the benefit stream for CASE requires placing a value on things that are hard to define, let alone to quantify. The successful analyst, therefore, will

Continued on page 22

Thumbs-up for DMS

Early users note pros, cons of design system

BY ROSEMARY HAMILTON
CW STAFF

Early users of the Sherpa Corp. Design Management System (DMS) have given this engineering data management system — one of the few available on the market — an overall thumbs-up, although they note it is difficult to use.

The San Jose, Calif., firm's DMS was designed as a management system for the volumes of data produced in a computer-aided design environment. DMS currently runs under Digital Equipment Corp.'s VMS operating system; a Sun Microsystems, Inc. version is expected later this year.

DMS, which was initially released in late 1986, is a "highly modified" version of Relational Technology, Inc.'s Ingres data base management system, the company said. License fees start at $24,500.

"I think Sherpa is trying to make it easier to use now, but it really can be a pain," said Bill Cowhig, manager of very large-scale integration design services at the David Sarnoff Laboratory in Somerville, N.J. "It required a good deal of expertise to embed our files in the Sherpa environment."

Along with another early user, the Radar System Group of the Hughes Aircraft Co. in El Segundo, Calif., Cowhig said that DMS has a long learning curve, but it has provided improvements in data management.

Continued on page 26

Read/write ability in Focus for RMS, RDB

BY NELL MARGOLIS
CW STAFF

NEW YORK — Write? Right. Information Builders, Inc.'s Focus can now write to Digital Equipment Corp.'s RMS files and VAX/VMS RDB relational data bases.

The advance beyond read-only capacity, which will be formally announced here next week at Dexpo East, marks an advance in portability for VAX-based Focus applications and also serves to protect the VAX community's substantial investment in RMS files and RDB, according to Albert D'Andrea, Information Builders' VAX systems marketing manager.

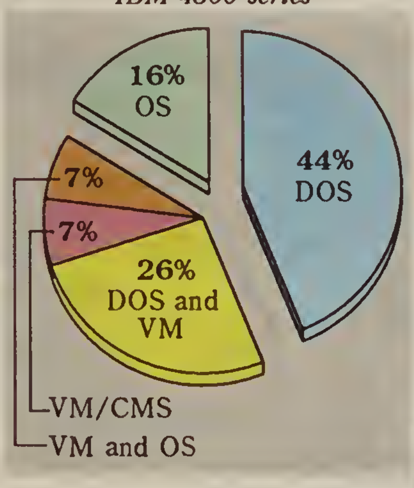
With read/write ability, he said, users can create Focus applications that will run against RMS, RDB or Focus data structures, or any combination of these. "This means that a user with old applications built around RMS files can enhance those files in Focus. They can plug new RDB data bases into old RMS files," D'Andrea said.

The move to read/write is a good one for Information Builders, according to Peter Burris, an analyst at Framingham, Mass.-based market research firm International Data Corp. The 1,000-plus copies of Focus installed on VAX platforms since 1986 account for approximately 25% of the product's installed base and revenue.

Continued on page 26

Data View

VM usage
IBM 4300 series



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

X Window team drafts major players

BY ROSEMARY HAMILTON
CW STAFF

CAMBRIDGE, Mass. — MIT, along with 13 computer companies, late last month launched a consortium to promote the use of the X Window System.

X Window is an emerging standard developed at MIT that provides a common method of displaying multiple applications on a computer screen.

Last month's announcement was a boost for the X Window movement as IBM, Sun Microsystems, Inc., Apple Computer, Inc. and AT&T made public their support for the standard.

The four companies did not participate in last year's unofficial gathering of X Window supporters, which included Digital Equipment Corp., Apollo Computer, Inc. and Hewlett-Packard Co.

Adoption plans

Each of the new members announced their plans to incorporate X Window into future products.

For instance, IBM, which has already put the X Window System on its RT PC, reiterated its intent to port X Window to the Personal System/2.

The members each paid $150,000 in order to join the consortium.

In addition to these new members, a number of smaller companies, such as Stellar Computer, Inc., joined as affiliate members at a cost of $15,000 each.

Inside

- XA Systems bolsters IMS-Xpert line. Page 27.
- Trax enhances 3-D spreadsheet. Page 27.

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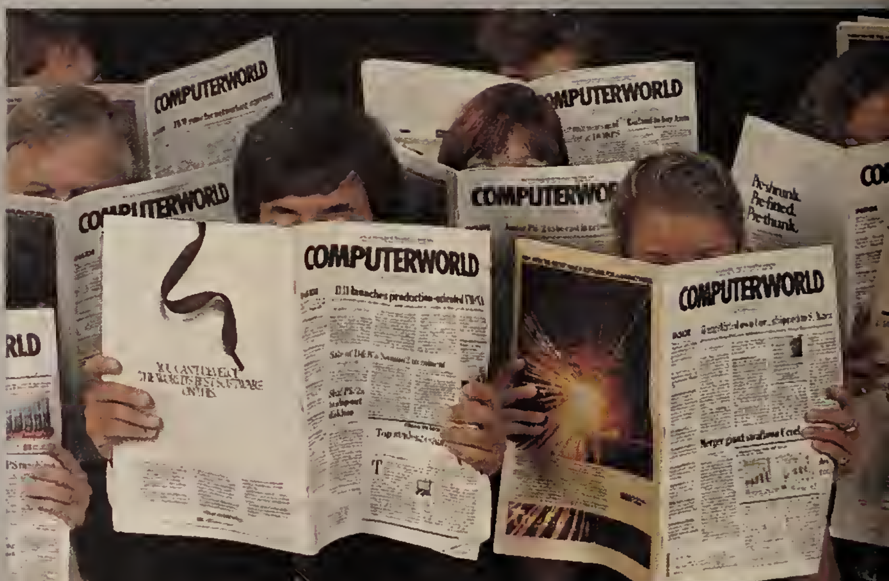

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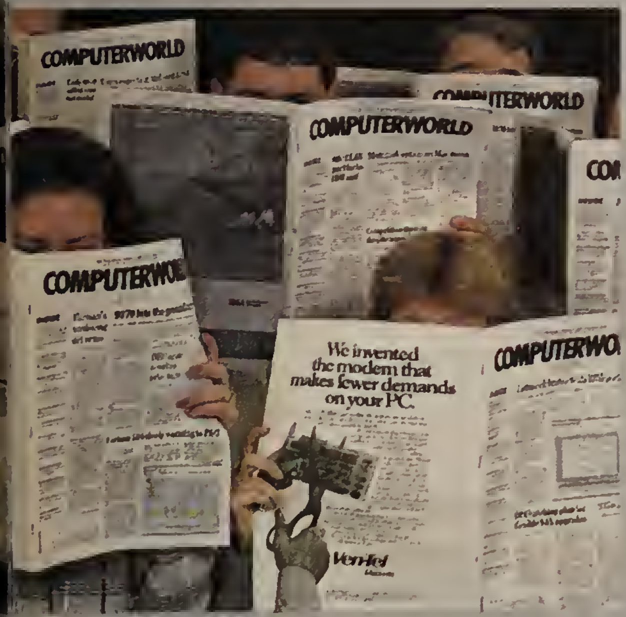

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Grochow

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move the discussion from a strict hard numbers approach to one of finding reasonable benefits for reasonable costs.

The best approach is to work backward from projected costs to find the required value of predicted benefits. In other words, if you calculate the cost of a CASE investment, you then know the value of the benefit necessary to make the investment worthwhile.

With a short leap of faith, you can then determine if that is a reasonable value to place on the totality of expected benefits. What you are really doing is getting people to use their experience and judgment to soften what might otherwise be only a quantitative decision.

A simplified cost plan for a medium-size data processing shop looking into CASE can be constructed and studied (see chart at right). Based on the figures in this plan, the organization would have to save approximately $3,250,000 in a five-year period (a horizon long enough for looking at investment returns) just to break even. Most companies have a target rate of return that would be added to that amount.

Looking at this figure strictly in terms of staff costs, what productivity improvement would be needed to save $3,250,000? If the departmentwide average salary and benefits cost was $40,000 per person, an average savings of 11% would do the trick. Since savings would be lower — or nonexistent — in early years, the productivity increase in the fifth year would probably have to approach 25% for these numbers to work out.

Is this improvement reasonable to expect? There are several considerations in answering this question.

Quantifying quality

As an example, a project team using CASE tools for the first time is unlikely to accomplish its task in significantly less time than it would have without CASE. What the team might do, however, is spend more of its time dealing with the substantive issues of the design or implementation rather than with the mundane or clerical aspects. Certainly, there is a value to this, but trying to directly quantify a "more complete design" or a "more elegant implementation" is likely to put you in murky territory.

A trickier question is how do you deal with the benefits of "improved system quality." CASE vendors tell us that using their products will result in better systems, but few try to define or value this benefit.

Hundreds of articles and books have been written on the topic of quality, and many manufacturing organizations have developed quality valuation systems. It is not that the quality of anything can't be valued, it is just that we have not yet agreed on a general definition or value of quality systems.

Nevertheless, while no one will directly put a value on improving system quality, most managers would agree that the combination of productivity improvement and improved system quality would be a powerful combination.

The bottom line is whether management buys your pitch or not. If they are looking for hard numbers all the way, it may be a long while before you can really sell them. If they are willing to accept a combination of hard and soft valuation, then you are well on the way to bringing CASE into your organization.

Grochow is vice-president of American Management Systems, Inc. in Arlington, Va.

Estimating the cost of CASE

Simplified computer-aided software engineering cost plan for an organization with a professional staff of 150

Investment:	
Workstation (personal computer) hardware: 75 at $5,000	$375,000
CASE software	
System planning tools (PC): five at $5,000	$25,000
Analysis/design tools (PC): 75 at $5,000	$375,000
Management tools (PC): 15 at $5,000	$75,000
Implementation tools (mainframe)	$250,000
Bridge and interface software development	
Consultants: 50 days at $1,000/day	$50,000
Staff training	
Trainers: 100 days at $1,000/day	$100,000
Staff time: 10 days each at $175/day	$262,500
Total investment cost:	**$1,512,500**
Ongoing costs:	
Software engineering group	
Three people at $50,000 (salary and benefits)	$150,000
Hardware maintenance: 75 at $500	$37,500
Software upgrades/maintenance	
Estimated at 10% per year for PCs	$47,500
Estimated at 15% per year for mainframes	$37,500
Ongoing staff training (done by software engineering group)	
Two days per person for staff of 150 at $175	$52,500
Attendance at user meetings, symposia	
Two people to attend four meetings at $1,500	$12,000
Miscellaneous (such as books, publications)	$10,000
Total annual ongoing cost:	**$347,000**
Five-year cost:	
Investment	$1,512,500
Five times annual amount	$1,735,000
Total five-year CASE cost:	**$3,247,500**

CW CHART

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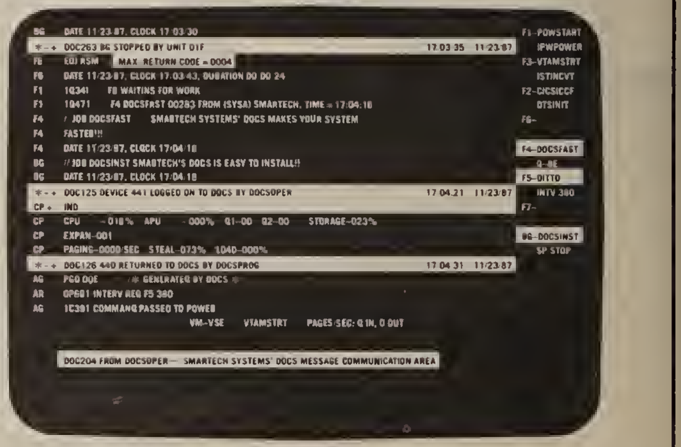

```
BG    DATE 11/23/87, CLOCK 17/03/30                                           F1-POWSTART
*-+   DOC263 BG STOPPED BY UNIT 01F                      17 03 35  11/23/87     IPWPOWER
FE    EOJ RSM    MAX RETURN CODE = 0004                                       F3-VTAMSTRT
FB    DATE 11/23/87, CLOCK 17/03/43, DURATION 00 00 24                          ISTINCVT
F1    1Q34I      FB WAITING FOR WORK                                          F2-CICSICCF
F3    1Q47I      F4 DOCSFAST 00283 FROM (SYSA) SMARTECH, TIME = 17:04:10        DTSINIT
F4    // JOB DOCSFAST    SMARTECH SYSTEMS' DOCS MAKES YOUR SYSTEM             F6-
F4    FASTER!!!
F4    DATE 11/23/87, CLOCK 17/04/10                                           F4-DOCSFAST
BG    // JOB DOCSINST SMARTECH'S DOCS IS EASY TO INSTALL!!                        Q-0E
BG    DATE 11/23/87, CLOCK 17/04/10                                           F5-DITTO
*-+   DOC125 DEVICE 441 LOGGED ON TO DOCS BY DOCSOPER    17 04.21  11/23/87     INTV 380
CP +  IND                                                                     F7-
CP    CPU   -018%   APU   -000%  Q1-00  Q2-00   STORAGE-023%
CP    EXPAN-001                                                               BG-DOCSINST
CP    PAGING-0000/SEC  STEAL-073%  LOAD-000%                                    SP STOP
*-+   DOC126 440 RETURNED TO DOCS BY DOCSPROG            17 04 31  11/23/87
AG    PGO DQE       /* GENERATED BY DOCS */
AR    OP68I INTERV REQ F5 380
AG    1C39I COMMAND PASSED TO POWER
                        VM-VSE    VTAMSTRT    PAGES/SEC: 0 IN, 0 OUT

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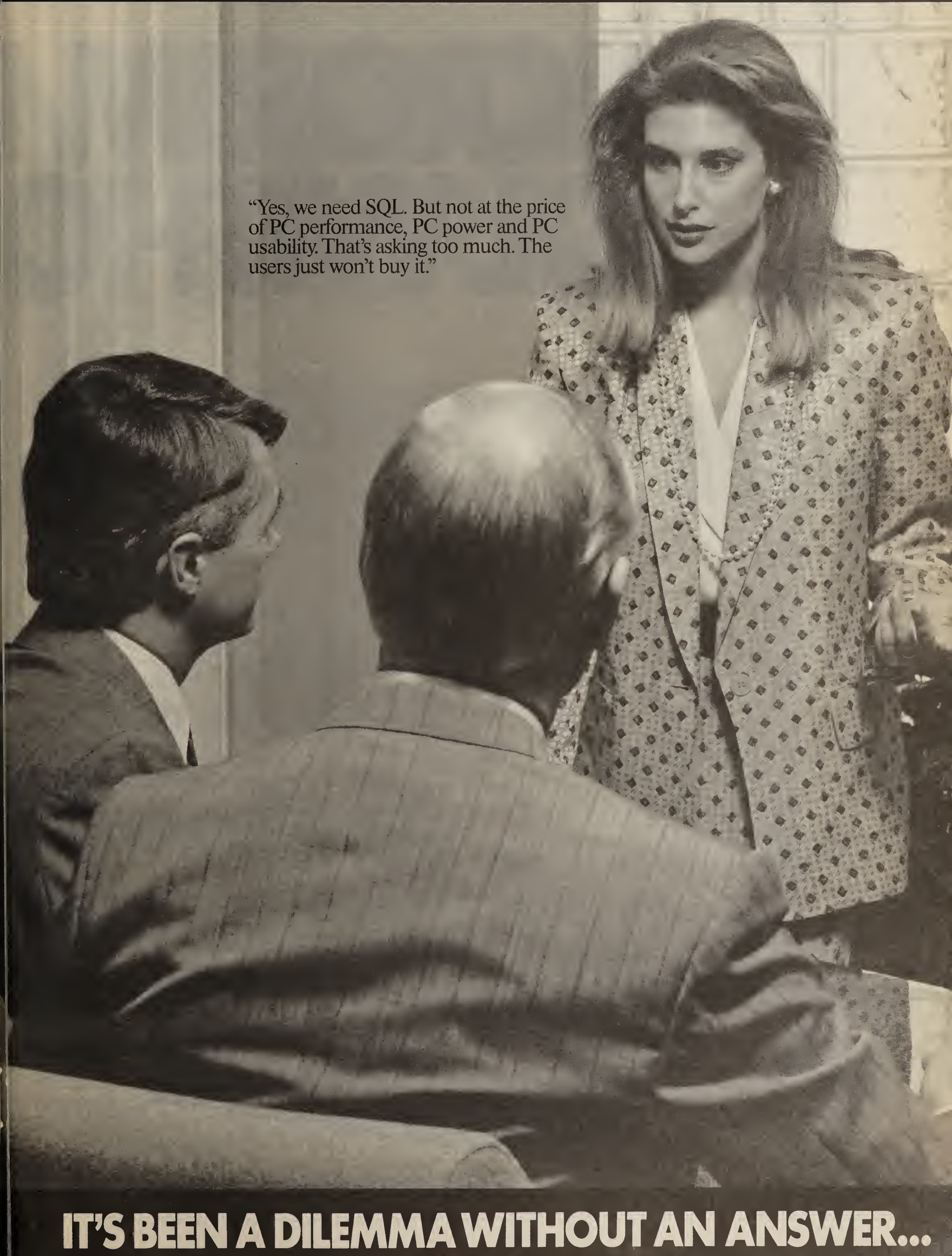
RELATIONAL DBMS SOFTWARE



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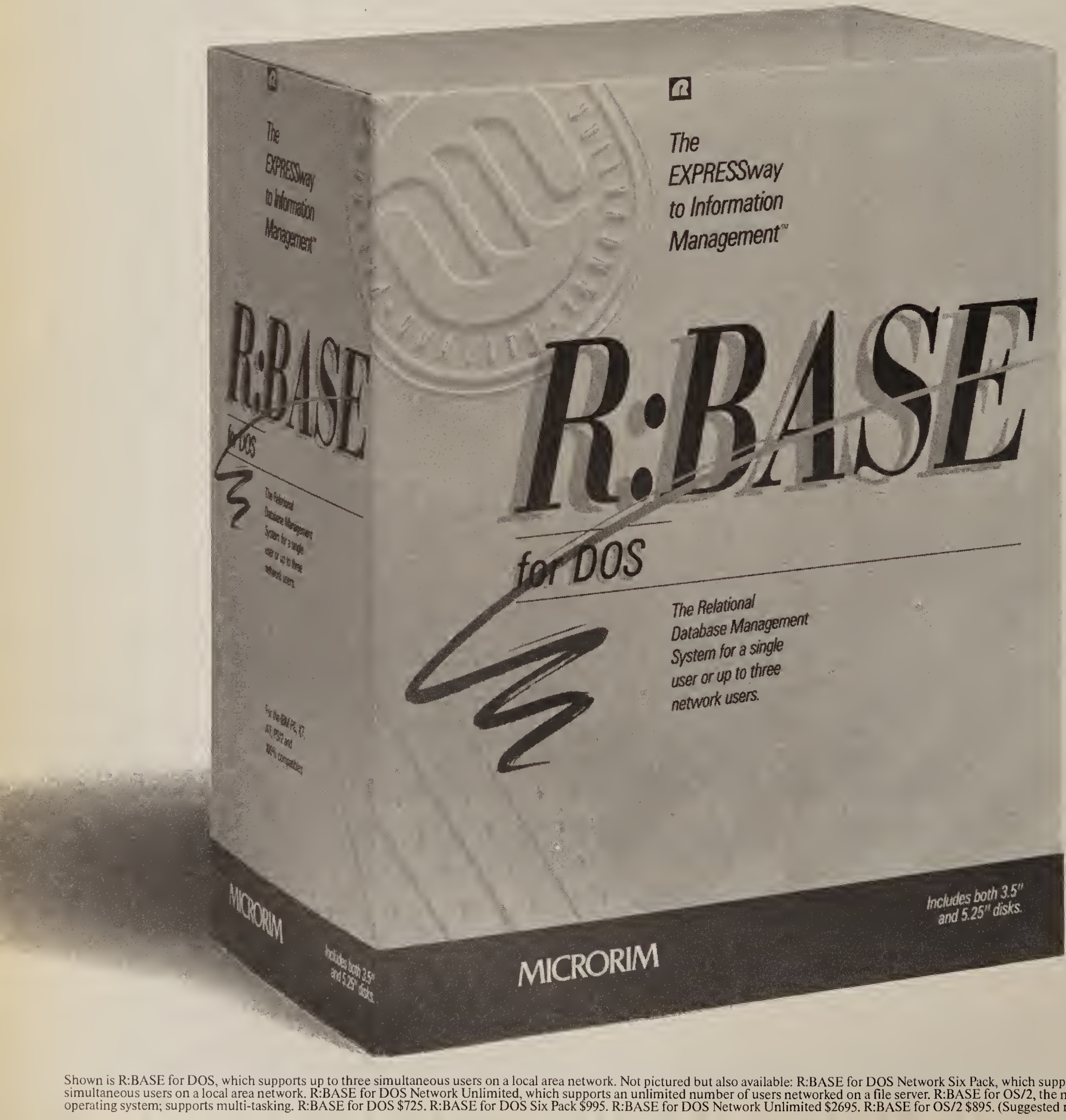
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Shown is R:BASE for DOS, which supports up to three simultaneous users on a local area network. Not pictured but also available: R:BASE for DOS Network Six Pack, which supports up to six simultaneous users on a local area network. R:BASE for DOS Network Unlimited, which supports an unlimited number of users networked on a file server. R:BASE for OS/2, the next generation operating system; supports multi-tasking. R:BASE for DOS $725. R:BASE for DOS Six Pack $995. R:BASE for DOS Network Unlimited $2695. R:BASE for OS/2 $895. (Suggested retail pricing).

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DMS

FROM PAGE 19

Hughes also said it has realized a big cost savings since moving DMS into production mode in mid-1987.

Few alternatives

Both users said DMS beat their alternatives, which were either developing an in-house system or selecting one of the few commercially available packages.

Hughes, for instance, considered the Computervision Corp. data management system but rejected it because it was not flexible enough for the Hughes environment, according to James Veronica, manager of integrated computer-aided design and manufacturing systems.

"To develop one on our own would have been too risky and taken more time and effort," Cowhig added. Cowhig's facility, which was the original beta-test site for DMS, was once part of RCA Corp. and is now a subsidiary of SRI International.

The Hughes facility estimated that DMS will bring it an annual savings of $1,000 per design file. Each design has between five and 10 files, or data bases, that belong to it. Each file had an associated manual system of paperwork, mailings and approval that no longer needs to be done. So far, Hughes has moved 500 data bases to DMS, which would represent a savings of $500,000 for that group of files alone.

THE Hughes facility estimated that DMS will bring it an annual savings of $1,000 per design file.

A key feature to the Sherpa system is its ability to set up relationships between files that are associated with a single design. When a change is made to one design file, it will be reflected in the associated file. As a result, engineers receive updated design files throughout the design process, and the likelihood of errors is reduced.

The Sarnoff Laboratory has completed one project and has another under way that would help automate design methodologies. Cowhig said the system gives design work a level of control that could not previously be achieved.

Focus

FROM PAGE 19

In addition to being portable between RDB, RMS and Focus files, applications written in Focus can incorporate data drawn from DEC's hierarchical DBMS data bases and from leading third-party DBMSs, including Oracle Corp.'s Oracle and Sybase, which Focus supports on a read-only basis.

Ingres, from Relational Technology, Inc., is expected to join the list next, sources close to the company said.

The interface's tool kit includes a proprietary data definition language that allows users to create VAX-supported files and data bases without recourse to a third-generation language; utilities that create Focus definitions for existing data; data maintenance facilities that include a nonprocedural language with if-then-else and "perform" constructs; and a report writer for formal and ad hoc queries.

The tool kit also includes screen and window painters and an end-user interface called Talk Technology, which gives occasional users entre into Focus using RMS, RDB or Focus files.

Price ranges

The Focus read/write interface to RDB is set to be available next quarter at prices ranging from $1,695 to $18,825, depending on the CPU.

Current Focus users will receive the interface as a free update.

Read/write capability for RMS files, available now, is bundled into the basic Focus package, available in a price range of $6,800 to $88,500, depending on the CPU.

Plain talk on why more and more workstation buyers are turning to HP.

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Brake assembly data courtesy of SDRC
Automobile data courtesy of Chrysler Motors

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HYPERchannel is a trademark of Network Systems Corp
NFS is a trademark of Sun Microsystems

NEW PRODUCTS

Systems software

XA Systems Corp. has expanded its **IMS-Xpert** line of software products designed to allow users to edit and browse IMS data bases on-line under IBM's TSO/ISPF or IMS/DC.

Existing Cobol and PL/I record layouts can be used to view and edit the data. Additions to the product line include IMS data base extract and load, which allows a user to select a particular group of segments and load them into an existing data base; the PL/I language option; an audit trail function; and IMS-Xpert/CICS, which provides full-screen browsing and editing for data bases on-line under CICS.

Pricing starts at $40,000.

XA Systems, 987 University Ave., Los Gatos, Calif. 95030. 800-621-0854.

A multiuser statistical quality control package for use on IBM System/36 and 38 minicomputers has been announced by **Murphy Software Co.**

SQC/3 outputs control charts, histograms, pareto charts, descriptive statistics and regression plots. According to the vendor, multiple control charts or histograms can be superimposed for correlation analysis. The program also supports trend testing and sloped and adjusted control limits.

SQC/3 is priced from $5,790 for the System/36 and from $11,975 for the System/38.

Murphy Software, 15301 Eleven Mile, Roseville, Mich. 48066. 313-445-2840.

Applications packages

An enhanced version of **Electronic Spread Sheet** (ESS), a three-dimensional mainframe spreadsheet and decision-support system, has been announced by **Trax Softworks, Inc.**

Version 4.0 of the software includes interfaces to IBM's DB2 and SQL/DS, support for Lotus Development Corp.'s in-worksheet macros, input panels for end users and increased processing efficiency, according to the vendor.

ESS Version 4.0 runs on IBM mainframes and compatibles under IBM's VM/CMS and TSO and Applied Data Resources, Inc.'s ADR/Roscoe. A perpetual license costs $8,000 to $15,000, depending on CPU size.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif. 90064. 213-475-8729.

Utilities

An enhanced version of the direct-access storage device (DASD) tuning utility **DASDmon** has been announced by **Duquesne Systems, Inc.**

Release 1.7 expands the data set placement manager component to produce recommendations based on application preferencing. The recommendations identify action items to improve DASD response time and pinpoint physical constraints. Users can also use batch routines in both SAS Institute, Inc.'s SAS and assembler languages.

DASDmon Release 1.7 runs under IBM's MVS/XA 2.2. It costs $15,000.

Duquesne Systems, 2 Allegheny Center, Pittsburgh, Pa. 15212. 412-323-2600.

Software said to be a functional replacement of the DL/1 reorganization unload and reload utilities has been released by **BMC Software, Inc.**

Called **Reorg Plus for DOS/VSE**, the software creates data bases identical in structure to those created by the DL/1 utilities. It reportedly contains an unload utility program, a reload utility program and a load program interface. Support is provided for HDAM, HIDAM, HISAM and all current versions of DL/1 and DOS/VSE as well as logical relationships and secondary indexes.

A perpetual license costs from $5,850 to $15,600.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487. 713-240-8800.

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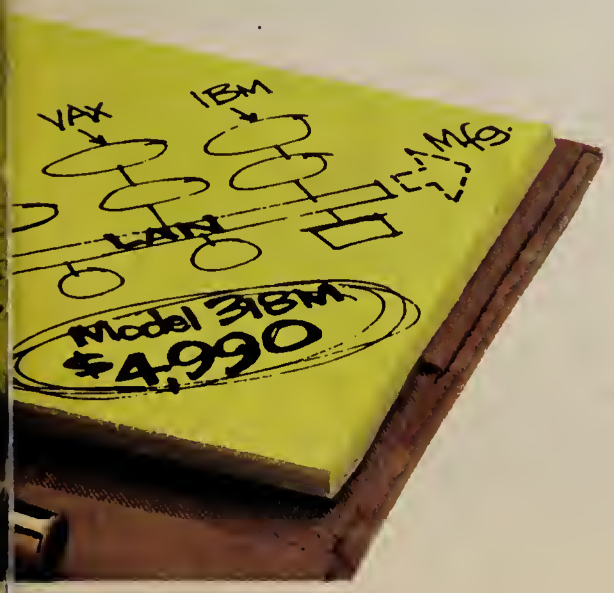

HEWLETT PACKARD

DS15722

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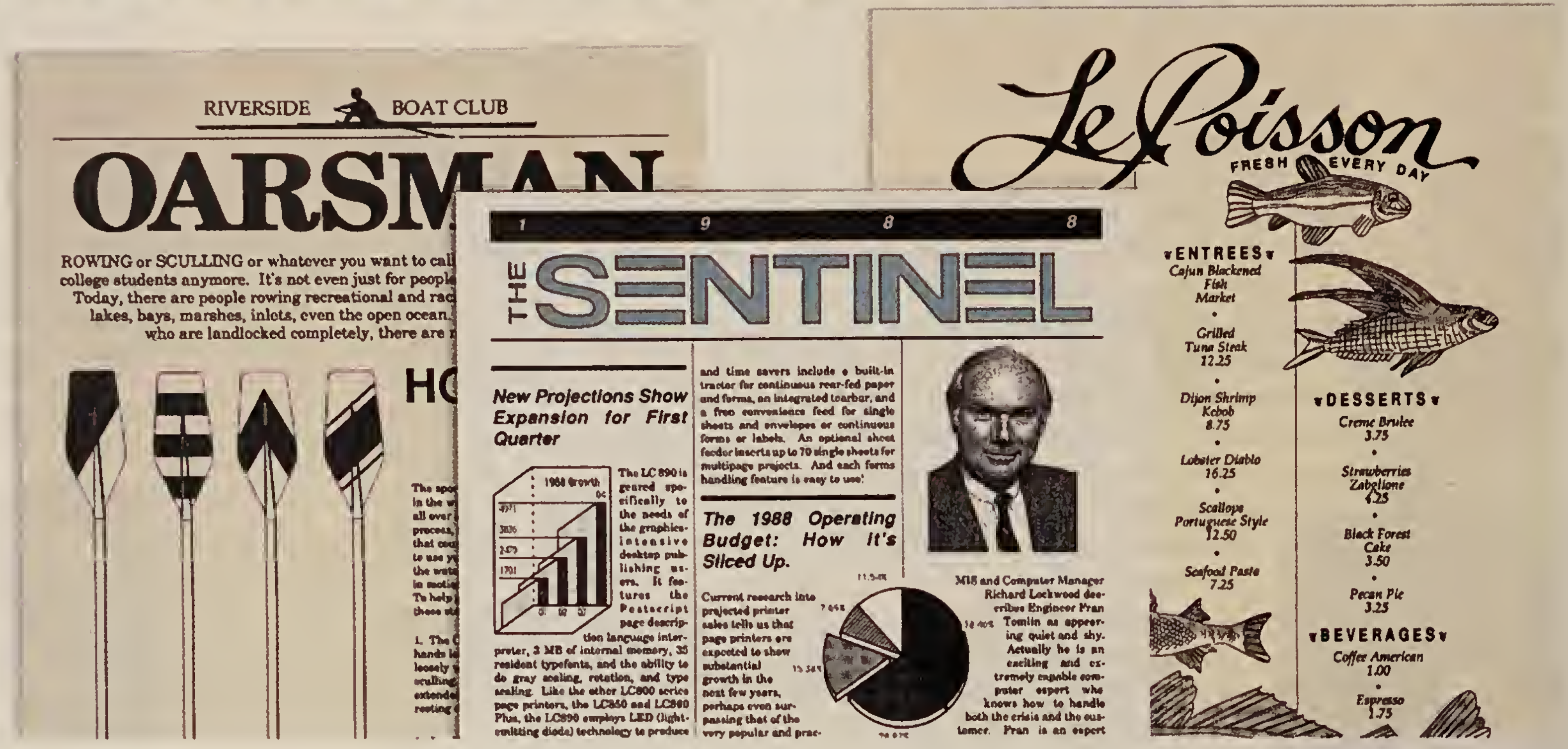

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college students anymore. It's not even just for people
Today, there are people rowing recreational and rac
lakes, bays, marshes, inlets, even the open ocean.
who are landlocked completely, there are

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THE SENTINEL

New Projections Show Expansion for First Quarter

The LC 890 is geared specifically to the needs of the graphics-intensive desktop publishing users. It features the Postscript page description language interpreter, 3 MB of internal memory, 35 resident typefonts, and the ability to do gray scaling, rotation, and type scaling. Like the other LC800 series page printers, the LC850 and LC860 Plus, the LC890 employs LED (light-emitting diode) technology to produce and time savers include a built-in tractor for continuous rear-fed paper and forms, an integrated tearbar, and a free convenience feed for single sheets and envelopes or continuous forms or labels. An optional sheet feeder inserts up to 70 single sheets for multipage projects. And each forms handling feature is easy to use!

The 1988 Operating Budget: How It's Sliced Up.

Current research into projected printer sales tells us that page printers are expected to show substantial growth in the next few years, perhaps even surpassing that of the very popular and prac-

MIS and Computer Manager Richard Lockwood describes Engineer Fran Tomlin as appearing quiet and shy. Actually he is an exciting and extremely capable computer expert who knows how to handle both the crisis and the customer. Fran is an expert

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Cajun Blackened Fish
Market
•
Grilled Tuna Steak
12.25
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Dijon Shrimp Kebob
8.75
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16.25
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12.50
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Creme Brulee
3.75
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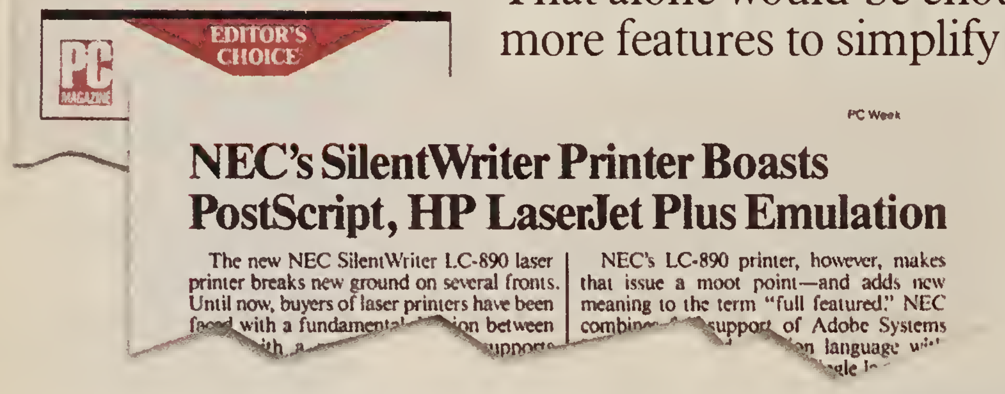
Strawberries Zabglione
4.25
•
Black Forest Cake
3.50
•
Pecan Pie
3.25

▾BEVERAGES▾
Coffee American
1.00
•
Espresso
1.75

Our Silentwriter™ LC890 is the first desktop publishing printer that gives you both popular standards for creating graphics and type: true Adobe PostScript® and LaserJet Plus emulation.

That alone would be enough to cause headlines. But we also added many more features to simplify desktop publishing. Like both Apple and IBM compatibility. *PC Week* stated, "the LC890 is actually better than having both an Apple LaserWriter Plus and an HP LaserJet Plus on your desk." Equally impressed, *PC Magazine* awarded it an "Editor's Choice." And cited it in their "Best of 1987" issue.



PC MAGAZINE

EDITOR'S CHOICE

PC Week

NEC's SilentWriter Printer Boasts PostScript, HP LaserJet Plus Emulation

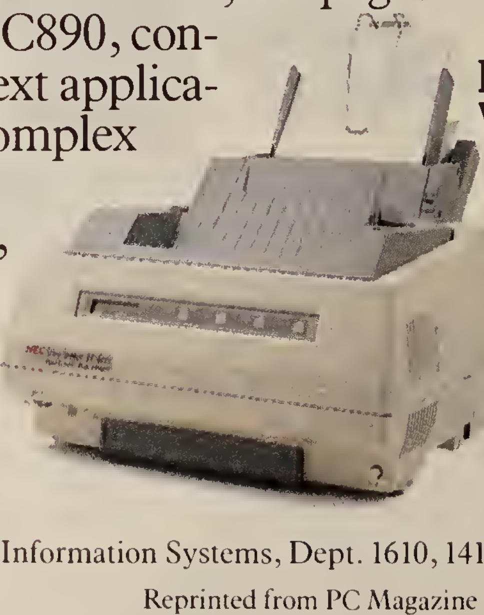
The new NEC SilentWriter LC-890 laser printer breaks new ground on several fronts. Until now, buyers of laser printers have been faced with a fundamental

NEC's LC-890 printer, however, makes that issue a moot point—and adds new meaning to the term "full featured." NEC combin support of Adobe Systems

And because the Silentwriter has a simple, trouble-free printing mechanism, it will be creating headlines for years to come. In fact, it's twice as reliable as ordinary lasers, with an average life of 600,000 pages.

If you don't require the power of our LC890, consider the rest of the family. The LC850 for text applications and the LC860 Plus for text and less complex graphics.

To start producing your own headlines, call 1-800-343-4418 (in MA 617-264-8635). We'll send you reprints of all the great reviews and the name of the NECIS dealer nearest you.



NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC

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C&C Computers and Communications

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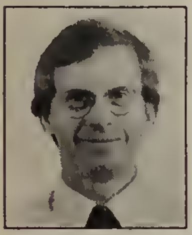
MICROCOMPUTING

MICRO BITS

Ed Scannell

Canion's song and dance



Will he or won't he? Compaq President Rod Canion told us on a recent visit that the company won't deliver an IBM Micro Channel-compatible system to market this year — maybe.

"I don't think we'll be doing it this year. We don't think we'll need to, but that doesn't say we won't," Canion told us. Hmmm, that seems to cover almost any possibility, although Canion seemed quite sincere about the likelihood of never bringing a Micro Channel architecture-compatible machine to market.

On another topic, Canion said he isn't worried about the IBM workstation that reportedly would combine reduced-instruction set computing (RISC) and Intel 80386 technology. The machine reportedly would run at around 10 RISC million instructions per second and would run many popular DOS-compatible programs.

"The game you are playing in there is one IBM always wins — the theoretical product. It's always going to be better and cheaper than anything else, but it has never worked out that way. So I don't believe it is go-

Continued on page 35

Grid laptop a first

Battery-powered unit runs Xenix, Unix

BY JAMES A. MARTIN
CW STAFF

FREMONT, Calif. — The first battery-powered laptop capable of running Unix and Xenix applications was announced last week by Grid Systems Corp.

The Gridcase 1530 laptop, based on the Intel Corp. 80386 microprocessor, was originally announced before Comdex/Fall '87 as a Microsoft Corp. MS-DOS system.

Since then, Grid said it has ported The Santa Cruz Operation, Inc.'s (SCO) Xenix System V and Interactive Systems Corp.'s 386/IX Unix operating systems to the 1530 laptop.

The Toshiba Corp. T5100 is reportedly the only other portable Unix system, but it is not battery powered.

Toshiba's portable is scheduled to be introduced at Uniforum in Dallas this week.

The 1530 running Unix is "a gorgeous machine," according to Abbi Lawrance, a laptop analyst at Infocorp in Cupertino, Calif. "I'm impressed by the fact that Grid was able to create a true portable based on the 386," she said, adding that both the Toshiba and Grid systems should be successful at fulfilling the need for a portable Unix environment.

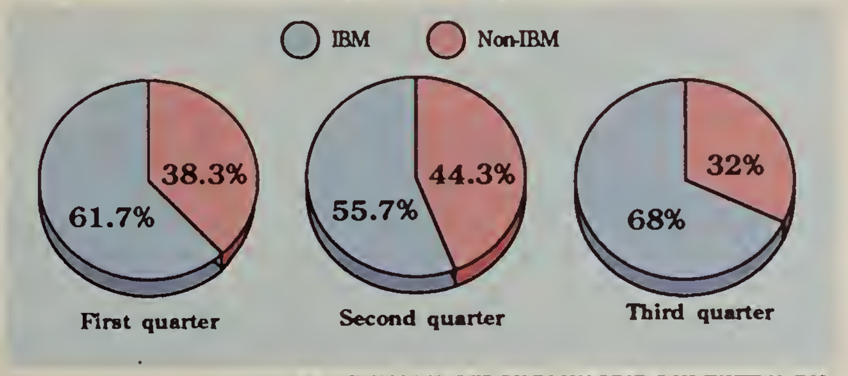
Grid is continuing negotiations with SCO and Interactive to bundle their operating systems with its laptop. An announcement regarding those talks should be made by late March.

Until then, users can expect to pay $4,695 for the 1530, $299 for Interactive's Unix and $695 for SCO's Xenix.

Data View

Best intentions

Share of personal computer buying intentions at Fortune 1,000 sites, 1987



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Lap-Link Mac connects to IBM PC systems

BY DOUGLAS BARNEY
CW STAFF

BOTHELL, Wash. — A new way of transferring data files between the Apple Computer, Inc. Macintosh and IBM Personal Computers was recently introduced by Traveling Software, Inc.

The company's $140 product is being released in response to the growing number of shops that are using both Macintosh- and IBM PC-compatible systems. In many cases, MIS organizations are now allowing end users to determine whether they need an IBM PC or a Macintosh and then grappling with the issues of heterogeneous networks.

Lap-Link Mac uses a 6-ft universal cable and serial ports to physically connect the different systems. Data files are transferred at 57.6K bit/sec., a rate significantly faster than file transfer via traditional modems.

Split-screen operation

When using Lap-Link Mac, the screen is split into two windows to display both the PC and the Macintosh file lists.

The order in which files are listed is user selectable, and files can be tagged for erasing or copying. On the IBM PC, file manipulation is accomplished by using menus that are found at the bottom of the screen.

Some vendors provide versions of software that run in both the Macintosh and IBM PC environments, with file structures that are compatible in both. For those applications, transferred files can maintain sophisticated formatting and, in some cases, macro information. Examples of these include Microsoft Corp.'s Excel integrated spreadsheet software and Aldus Corp.'s Pagemaker desktop publishing software.

Lap-Link Mac can take advantage of Apple's Multifinder operating system, which provides a rudimentary form of multitasking and task switching. The product also supports Apple's Appletalk network, the Sun Microsystems, Inc. TOPS network and 3Com Corp. and Novell, Inc. networks.

The linking system supports the full line of IBM personal computers, including the Personal System/2 family, as well as the full line of Macintosh computers, according to Traveling Software. Lap-Link Mac is expected to ship later this month and will be available through computer dealers.

Inside

- Compaq's Deskpro 386/20 gives more power to desktop user. Page 33.
- Finkelstein and Pascal examine the effects an optimizer has on a DBMS benchmark. Page 33.
- Mitsubishi announces family of MS-DOS-compatible PCs. Page 37.

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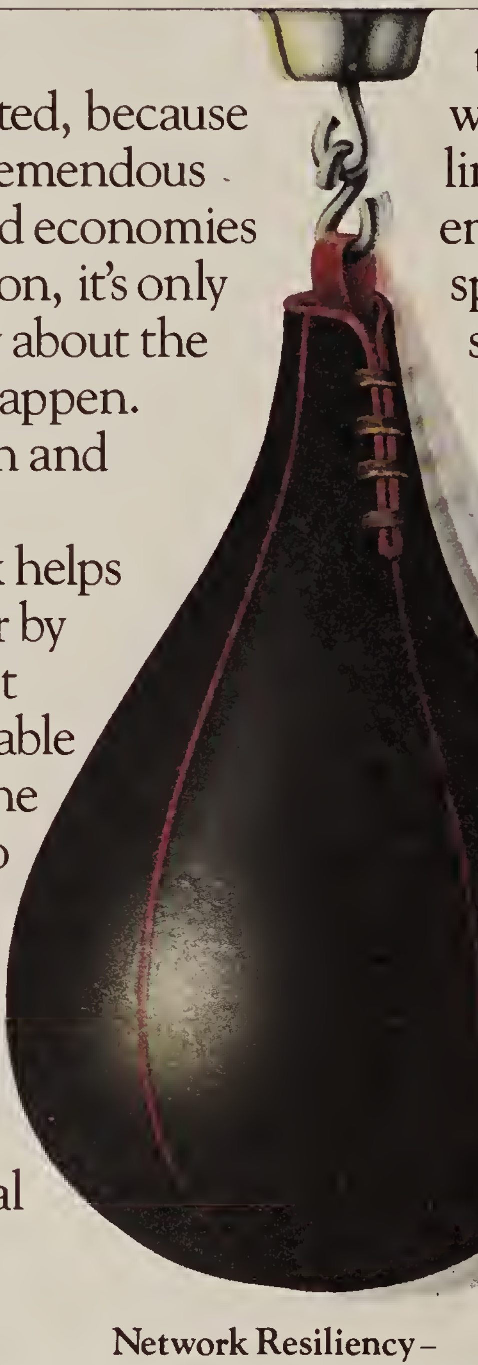

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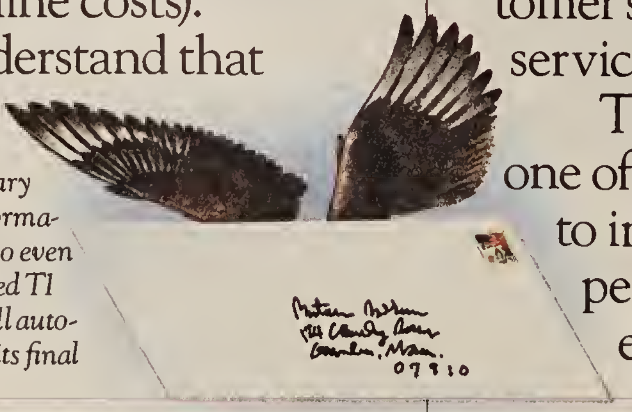

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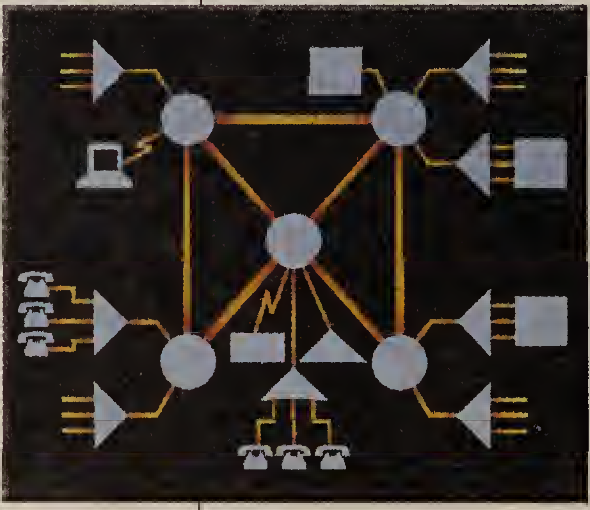

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SMALL TALK

William Zachmann

Much ado about OS/2

With considerable fanfare, IBM last fall announced early (December 1987) delivery for OS/2 Standard Edition 1.0.

Since IBM's original announcement of OS/2 and the Personal System/2 line of personal computers last April, many have also believed that OS/2 would offer a compelling reason to buy IBM's newer, more proprietary systems. Many have believed that PS/2 and OS/2 would usher in a dramatic new era of software.

Unfortunately, OS/2 Standard Edition 1.0 offers little to support those beliefs. True, there are more problems getting it to run on compatibles than there have been in the past with IBM versions of Microsoft's MS-DOS. But there are also more problems getting it to run on IBM's own PC AT and 80286-based PCs with third-party boards and peripherals.

Of course, IBM would surely prefer that everyone bought all their personal computer systems from IBM at IBM prices. But buyers concerned about getting the most from their money, which now includes even most of IBM's biggest and most

Continued on page 36

Laptops stand tall

Portables seen infiltrating corporate America

BY JAMES A. MARTIN
CW STAFF

After several years of false starts, 1988 looks like the year the laptop makes some important gains in corporate America.

With a number of major players expected to introduce more powerful systems, analysts say they expect laptops to gain greater acceptance among MIS managers this year.

Users are "demanding higher resolution and true portability, and 1988 is the year in which we'll start to see those gel," says Tim Bajarin, executive vice-president of Creative Strategies Research International, Inc., a consulting firm in Santa Clara, Calif.

Laptop sales increased greatly during 1987, according to industry estimates. Figures released last week from IMS America Ltd., which tracks computer retail sales, indicate that 16,200 laptop systems were sold during the first 11 months of 1986, compared with 79,400 during the same period in 1987.

Market shares fluctuate

The increase in laptop sales has caused vendor market shares to fluctuate, according to IMS. For the three-month period ending in August 1987, NEC Corp. held 36% of the market, compared with 31% for Toshiba Corp. and 27% for Zenith Data Systems, Inc. By November, however, NEC rose to 50%, Zenith dropped to 24%, and Toshiba was down to 18%.

Venture Development Corp. predicts that laptops shipped in the U.S. will increase from 350,000 units in 1987 to 455,000 this year and to 850,000 in 1992.

Major vendors expected to make laptop announcements this year include IBM, with a PC

Continued on page 35

Homegrown PCs make the grade at university

BY ALAN J. RYAN
CW STAFF

KENT, Ohio — Nearly a year after a small computer shop opened its doors on the Kent State University campus here, student and staff workers have built and sold more than 300 personal computers. That surpassed the first-year sales goal of 50 units by more than 600%.

As personal computers became increasingly important on the Midwestern campus, university President Michael Schwartz and director of information services Bill McKinley felt they needed to find a way to bring computers to students and faculty at affordable prices.

Although vendors offered discounts for volume purchases, McKinley knew the IBM Personal Computer-compatible units could be built on-site at even greater savings.

"Through market research, we determined that we could build a computer packaged with dual disk drives, 640K bytes of random-access memory, a Hercules monochrome graphics card, a Zenith monitor, MS-DOS and GW Basic for $850," said Mike Shuman, a computer equipment specialist.

The university arranged to become a licensed Microsoft Corp. OEM. Kent State purchases its motherboards, power supplies, keyboards, boxes, disk drives, controller cards and peripheral cards on the open market, soliciting bids from vendors and suppliers.

The units are assembled and burned in at the on-campus shop of Dave Futey, who employs three to five students — generally from the college's computer science, physics or technology departments — to help. The

Continued on page 36

Deskpro powers up

BY JULIE PITTA
CW STAFF

Corporate users seeking more power on the desk top have found one answer with Compaq Computer Corp.'s 20-MHz Intel Corp. 80386-based Deskpro 386/20.

Many companies are using the higher performance Deskpro 386 in a number of configurations, and users expressed satisfaction with the system's quick processing speed and the fast access time of its disk drives.

"It adds that one extra piece," said Sherrie Burger, manager of office information systems for Blue Cross/Blue Shield of Illinois. "It's fast, friendly, flexible and easily upgraded."

Currently, Blue Cross/Blue Shield's information center in Chicago has four Deskpro 386/20s, with another 25 on order. Burger said the systems will be connected to mainframes or a Digital Equipment Corp. VAX.

Blue Cross personnel will use the Compaq personal computers to access claims histories and financial information stored on the larger systems. The high end of the Compaq line suited the company because of its disk storage capacity, which is up to 300M bytes on a single 5¼-in. hard disk drive, the fast access time of those drives and the PC's processing speed, according to Burger.

"People need reports immediately," Burger explained. "We don't have all day."

Further, Blue Cross/Blue Shield has been pleased with Compaq's customer support.

Continued on page 36

Deskpro 386/20

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Don't believe all you read about benchmarks

BY FABIAN PASCAL
and RICH FINKELSTEIN
SPECIAL TO CW

Second in a three-part series.

One of the main criteria for selecting a data base management system package is usually performance. While other factors tend to be subjective, performance is quantifiable and has an aura of objectivity to it. In the first installment of this series, we discussed the value of the SQL optimizer and its importance when evaluating performance. Now we will begin to examine the effects an optimizer has on any DBMS benchmark.

Benchmarks should be used to help predict the performance of a DBMS in a specific organization. However, evaluators sometimes turn to benchmarks that are written up in magazines. This may be sufficient in some cases, but benchmarks run by software reviewers are often not applicable to the mix of transactions and queries that will be run in a particular organization.

They do provide some guidance on the relative speed compared with other products, but this has limited merit, since it is not too difficult for a vendor to tune its DBMS to do well in a particular publication's test.

Generalized benchmarks can be used with somewhat greater assurance. Make no mistake: There is much controversy about the accuracy of these benchmarks, and there is a substantial amount of research under way to improve their value.

It is also not always clear what these generalized benchmarks are testing, which makes it difficult for the evaluators to verify that the benchmark is applicable to their environment. This seems to be lost on the benchmark designers, who do not document their benchmarks in terms that can be widely understood. This does not negate the work they are doing; it merely means they have to document benchmarks in more understandable terms.

Make your own

Unless a DBMS evaluator can come up with a benchmark that truly reflects his organization's transaction and query mix, the firm may be forced to develop its own benchmark. This is not a trivial task. The evaluator must have a fairly good idea of the type of update that will be performed and, what is more difficult, a sense of the type of query that will be entered now and in the future.

For larger projects, there may be resources available to do this type of evalation, but in most cases, this would be too costly, or the skills required would be unavailable. This is why most evaluators try to simplify the task by choosing a simplified model of the update or query transaction load to compare DBMS products.

Evaluators often take current data bases, which are not normalized or reflective of any new system design or system requirements, and use them as their source for information. This again simplifies the benchmark but only serves to show how well a DBMS can perform in the old data base environment. It rarely helps predict how the DBMS will act in a new relationally oriented environment.

It is, therefore, not surprising that a new SQL DBMS often performs worse than the old DBMS or some nonrelational system. This is because the old data base structure was tuned for the old DBMS software, which does not take full advantage of SQL's optimizer and set-processing capabilities.

Evaluators may be able to get around these difficulties by examining the characteristics of a DBMS's SQL optimizer. By evaluating the optimizer's architecture and looking at how the optimizer performs across a broad range of queries, evaluators may be able to judge how the DBMS will perform in different, future environments.

A DBMS may be initially targeted for a specific project, but it will hopefully be used in other systems as well, and it is important to have an SQL DBMS with an optimizer that can react well to an expanding set of requirements.

Next week: Specific areas to consider when developing a benchmark.

Pascal is an independent analyst based in Washington, D.C., and is affiliated with the Codd & Date Consulting Group, specializing in relational technology and SQL on microcomputers. Finkelstein is a senior consultant with Codd & Date.

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Scannell

CONTINUED FROM PAGE 29

ing to be a threat," Canion said.

Canion pointed out that IBM has tried before to bring DOS compatibility to the RT PC via an Intel 80286 board. He said the board allowed the RT to run many popular DOS programs but at half the speed of an IBM Personal Computer AT.

Neither is Canion worried about the threat Sun poses to Compaq in the workstation market. While he said he respects Sun's products, Canion added that he doesn't believe Sun can build nearly as effective a distribution channel as Compaq.

"Sun has to break into the [retail channel], where we are an established player. [The retail channel] has kept an awful lot of of good companies from having a major success," Canion said.

Rappin' with Rod. A source close to Compaq tells us the company has put together a rap video to promote the company and products to dealers. The folks who produced the video wrote the lyrics, which were rapped out by some high-level Compaq executives. We hear noted rapmaster L. L. Cool J has nothing to worry about.

Out the door. During the last couple of weeks, two interesting products have shipped. The first is Micrografx's Designer, a great full-color graphic arts and technical illustration-drafting program.

The second is Lifetree Software's Total Word, a word processing package that allows users to perform many of the functions found in desktop publishers that are more expensive and more difficult to use.

Under protected mode. One of the more unusual requests we've received lately came from an inmate who wanted to know if we could donate an old computer.

It seems our friend in the Big House, who earns $26.40 a month, hasn't been able to save enough money for even a low-cost clone. And his chances of getting out soon to buy one aren't good either (he says he'll be in prison for "at least another decade"). The inmate, David Duhaime, is incarcerated at Washington State Reformatory. He claims it is the only house of correction in the U.S. that allows inmates to have a PC.

Duhaime says he's allowed to have an IBM PC-compatible system (I guess even wardens these days have reservations about the Micro Channel, although I hear he's just wild about OS/2 Extended Edition) with 5¼-in. drives, although the system can't have a modem (you know, contact with the outside world).

So if you feel inclined to help Mr. Duhaime out, you can contact him at the Washington State Reformatory Monroe, P.O. Box 777, Monroe, Wash. 98272.

Scannell is a *Computerworld* senior editor, microcomputing.

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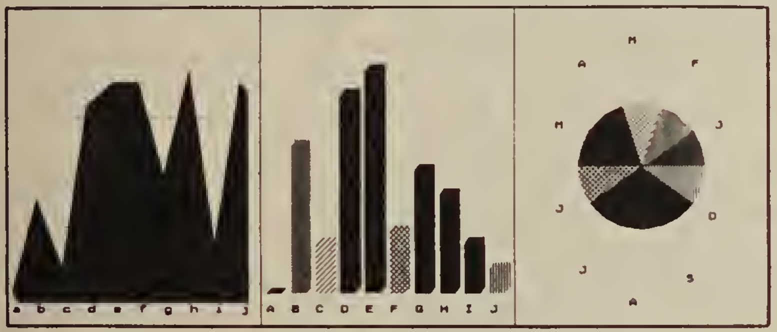

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Laptops

CONTINUED FROM PAGE 33

Convertible centered around the Intel Corp. 80286 chip, and Zenith, which has a technology that reportedly improves the resolution of an LCD without heavily draining the battery supply. Neither company has confirmed or elaborated on these reports.

Compaq Computer Corp. and Apple Computer, Inc. are rumored to be preparing systems for introduction this year if the marketing opportunities are strong enough.

Overseas competitors, among them Samsung Electronics Co. and Mitsubishi Corp., are also expected to increase their presence soon in the growing laptop arena.

Inspires a conference

This year, the laptop will be, for the first time, the sole subject of a trade conference. Executive Computers, Inc., a laptop reseller in New York, says it expects between 3,000 and 5,000 people to attend its Laptop 88 conference in New York this June. The bulk of attendees are expected to be users.

Despite growing acceptance, the laptop is still a long way from mainstream acceptance. Desktop computing power to go — when and where you want it — is a big promise, but the trade-offs to date have often been significant.

"The biggest problem today is true portability," says R. Bruce Johnson, analyst and manager of the PC Resource Center at Deloitte Haskins & Sells in New York, which manages some 2,000 portables and 100 laptops. "When you try to get something that is highly functional and readable, it turns out not to be very portable at all."

Hard-disk capacities remain limited on laptops, although analysts say they expect 20M- and 40M-byte hard disks to become standard this year. In addition, only a few laptops are based on higher speed microprocessors such as the 80286, and users are starting to require much faster speeds.

Service and support

On-site support for laptops is another concern. "It seems to be impossible to get on-site service for laptops, probably because of their small size," says Sherry Ryan, director of end-user computing at Levi Strauss & Co. in San Francisco. Levi Strauss currently has close to 400 Compaq and Grid Systems Corp. systems. "We often have to ship them in for service," she adds.

Laptop power consumption is not a major worry, however. "It's just not as important as some people make it out to be," says Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Corp. in Chicago. "We're really looking just for convenience. As long as you can plug it in, it's not a concern."

Ultimately, the benefits of laptops will outweigh the shortcomings, some users say.

Having a microcomputer to check out at night like a library book does more than encourage productivity, according to Deloitte Haskins' Johnson. "We have found the people who grow fastest in terms of computer literacy are the ones who take a computer home now and then," Johnson says.

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Zachmann

CONTINUED FROM PAGE 33

loyal customers, are accustomed to greater freedom of choice.

Hopefully, the considerable inconvenience users stand to experience trying to get OS/2 Standard Edition 1.0 to work with third-party display adapters and disk controllers isn't a sign of IBM's "Year of the Customer" campaign coming to an end. The real problem with the system is not its superior ability to refuse to function properly with a greater number of compatible systems and third-party boards than MS-DOS. There are generally ways to work around such problems. The more compelling question is, Why bother to do so?

It doesn't take much experimenting with the $325 OS/2 Standard Edition 1.0 to discover why everybody isn't rushing right out to buy it. These reasons fall into two categories.

First, it requires a lot more resources than most users have, including most of those who bought PS/2s. Second, despite its high cost and enormous resource demands, OS/2 Standard Edition 1.0 provides little practical value. Whatever its attributes, they can be gained in other, more economical ways.

For openers, a 286- or 386-based system with a minimum of 1.5M bytes of memory is required just to get OS/2 Standard Edition 1.0 running. Make that 2M bytes if you want to run MS-DOS applications. You will also need about 5M bytes of hard-disk space for the files. These are minimum requirements.

Disloyal customers who bought compatibles or third-party boards for ATs are not the only ones who have a problem. Owners of older 6-MHz ATs will find that even with sufficient memory, the lethargic pace of the processor will not provide satisfactory performance for any practical use of OS/2.

However, these people at least have the consolation of knowing they've got an old system. Worse yet is the fate of owners of recently purchased PS/2 Model 50s who are looking forward to the supposed benefits of OS/2 Standard Edition 1.0. For them, the bitter truth is that while the new operating system will run on their Model 50s, it will just barely run. Sadly, a PS/2 Model 50 is barely an adequate platform for OS/2 Standard Edition 1.0 — with the emphasis on barely.

The bright spot in all this is that the vast majority of users have little reason to want to run OS/2 Standard Edition 1.0 anyway. Microsoft's Windows/386 is a vastly superior product in terms of practical value delivered today and is ready for anybody fortunate enough to own a 386-based system. Products like Microsoft Windows 2.0 already offer superior functionality on less capable systems.

The promise of OS/2 still looks good for the long term. It is just that OS/2 Standard Edition 1.0 does little to deliver on that promise.

Zachmann is vice-president of research at International Data Corp.

Deskpro

CONTINUED FROM PAGE 33

"We don't have to talk to 14 zillion people to get help," she explained.

Gibralter Savings & Loan in Houston has about a half-dozen Deskpro 386/20s, according to David Swatzell, manager of technical support. He said, however, that the system will make up the majority of the bank's future PC purchases. Of the 160 microcomputers at Gibralter's headquarters, 80% are Compaq systems.

Gibralter is using the higher end Deskpros in a number of configurations, including connecting them to IBM mainframes, as stand-alone systems and as file servers in a local-area network. The bank has developed 26 vertical applications for the Compaq systems for tasks such as investment management, customer service and loan processing.

Swatzell said Gibralter will shy away from IBM's Personal System/2 Model 80, a direct competitor of the Deskpro 386/20, until applications for OS/2 — the operating system designed by Microsoft Corp. and IBM to take full advantage of the Micro Channel — become widely available.

"The Micro Channel [IBM's proprietary bus design] is innovative but not for people who have problems right now with crunching data," Swatzell said. "Without OS/2, there's nothing out there right now to leverage that technology. Our big issue is crunching through hundreds of records now."

Fred Leviton, assistant executive director of the National Foundation of Dentistry for the Handicapped in Denver, has made the transition from a traditional minicomputer to a terminal data processing system to a LAN.

Until recently, Leviton's organization connected Wang Laboratories, Inc. LVT terminals to a Wang 2200 minicomputer. Today, the foundation uses Novell, Inc. networking software and Arcnet communications boards to link AST Research, Inc. 80286-based PCs with a Deskpro 386/20 as a file server.

File information for between 25,000 to 30,000 patients is stored in the Deskpro's 300M-byte hard disk drive.

Look out for PS/2

Despite its success, Compaq's Deskpro 386/20 faces stiff competition from IBM's PS/2 Model 80.

IBM shipped 100,000 PS/2 Model 80s last year, compared with 76,000 Deskpro 386/20s in 1987 for Compaq, according to Dataquest, Inc. IBM got a head start on Compaq: The Model 80 began shipping in July, and delivery of the Deskpro 386/20 commenced in late September, at the time of its debut.

Despite IBM's lead in the high-performance 386 battle, Compaq is firmly entrenched, according to Bill Lempesis of Dataquest.

"They're probably the leader in 386 machines in terms of the diversity of their line and their reputation for being the first out of the block with that technology," he said.

Homegrown PCs

CONTINUED FROM PAGE 33

technicians also offer applications and built-in menus as options to the $850 price.

As with commercial systems, buyers are offered a standard one-year warranty period and an optional service contract. Servicing on campus can be as quick as a half-hour, depending on the work load of the technicians, Shuman said. The computer shop also offers technical support over the phone.

The PC shop will configure systems to meet the needs of the buyer. "If they need a mouse, we'll give them a mouse. If they need a 3½-in. drive, we'll give them that," Shuman said.

The shop is nonprofit, Shuman said, allowing the Kent PC to be sold for the price of the parts plus assembly. "It's pretty much a break-even deal," he said.

McKinley said the Kent PC is available only to Kent students, faculty and staff. "We have no interest in competing against the manufacturers." He added that other vendors still sell equipment to the university.

An IBM PC XT-compatible model, which is the basic Kent PC with a 20M-byte hard disk substituting for one of the floppies, sells for $1,200.

An AT compatible running at 6, 10 or 12 MHz with 1M byte on the motherboard, a 40M-byte Seagate Technology, Inc. drive, turbo and reset switches on the front, Hercules Computer Technology, Inc. monochrome graphics, a Zenith Data Systems Corp. monitor and Microsoft MS-DOS and GW Basic sells for $2,025.

U.S. BANKRUPTCY CT./S.D.N.Y. - NOTICE OF BAR DATE
In Re: NEW YORK BUSINESS COMPUTERS, INC. Case No. 87B 11620 (PBA)

Notice: By 1/25/88 Order the U.S. Bkrcy. Ct./S.D.N.Y.-U.S. Customs Bldg., 1 Bowling Green, NY, NY 10004-1408 has fixed 2/16/88 as the last date for filing Proofs of Claims against the Debtor for all pre & post-petition claims arising on/prior to 8/19/87 through 1/15/88 (except for professionals). The Bar Order may be examined at the Bkrcy. Ct.

On/before 2/16/88 all claims including post-filing, secured, priority, wage & tax, & unsecured claims must be filed with the Clerk, Bkrcy. Ct., copies to undersigned, or be forever barred from asserting such claims agnst. the Debtor & from being treated as a creditor for voting on the plan or sharing in any distribution; the holder of non-filed claims shall be bound by the Plan.

Creditors on the Schedules not listed as disputed, contingent, or unliquidated are deemed properly filed.

Creditors need not file claims if: such claims are listed on the Schedules & are not listed as disputed, contingent or unliquidated, so long as, the amount or manner is not disputed.

Creditors who have filed Claims need not file again.

Confirmation will discharge any debt that arose before confirmation whether or not a claim is filed, deemed filed, allowed, or claimant has accepted the plan.

Dated: January 25, 1988
SHAW, LICITRA, EISENBERG, et al.
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NEW PRODUCTS

Systems

A family of 12-MHz, Microsoft Corp. MS-DOS-compatible personal computers based on the Intel Corp. 80286 microprocessor has been announced by **Mitsubishi Electronics America, Inc.'s** Computer Systems Division.

The family, called the **MP 286 Series 300**, is also Xenix compatible. Configurations include a 1.2M-byte floppy-disk system for $1,995; a 1.2M-byte floppy disk with monochrome monitor for $2,295; a 1.2M-byte disk with an enhanced graphics adapter monitor for $2,995; a 1.2M-byte floppy-disk and a 40M-byte hard-disk subsystem for $3,095; a 1.2M-byte floppy-disk and a 40M-byte hard-disk subsystem with monochrome monitor for $3,395; and a 1.2M-byte floppy-disk, 40M-byte hard-disk subsystem with an enhanced graphics adapter monitor for $4,095.

All systems come with 640K bytes of expandable random-access memory and six full-size expansion slots.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502. 213-515-3993.

The **Professional Office Publishing System**, a turnkey desktop publishing system for IBM Personal Computers and compatibles, has been announced by **CIE Terminals, Inc.**, a subsidiary of C. Itoh Electronics, Inc.

The system includes CIE Terminals' 10 page/min Lips 10 Plus laser printer and Laser Friendly, Inc.'s The Office Publisher desktop publishing software, developed by Print Three, Inc. Capabilities include document formatting, page composition, text editing and printing.

The Professional Office Publishing System operates under Digital Research, Inc.'s Graphics Environment Manager environment, better known as GEM, and provides a what-you-see-is-what-you-get interface.

The Professional Office Publishing System is priced from $3,995 to $4,995.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714. 714-660-1421.

Software applications packages

The **Ultimate Parcel Shipping System** (UPSS), a software program said to automate the United Parcel Service, Inc. (UPS) shipping process, has been announced by **Aristo Computers, Inc.**

UPSS is said to meet all UPS requirements for a computer-based shipping system. It saves customer lists, automatically calculates UPS zones, shipping charges, insurance fees and call charges. It also prints UPS mainfest, c.o.d. labels, standard shipping labels, reports of internal company uses and all required UPS summaries.

According to the vendor, users can modify the built-in data. Data files are compatible with Ashton-Tate Corp.'s Dbase III.

UPSS costs $395. It runs on IBM Personal Computers.

Aristo Computers, Suite 213, 16811 El Camino Real, Houston, Texas. 77058. 713-480-6288.

A scheduling system called **Jobtime Plus**, designed for use on IBM Personal Computers, has been announced by **Wyman Associates, Inc.**

The software features a backward-pass method of scheduling said to recognize a hierarchy of assembly jobs and automatically set release dates. It also provides finite-capacity forward-pass scheduling that calculates start, finish, release, move and queue times to the minute, according to the vendor.

Other features include capacity requirements reporting, on-screen production bar charts, 500 reports, job tracking and status query support for up to 100,000 tasks.

Jobtime Plus costs $8,500.

Wyman Associates, Suite 321, 181 Second Ave., San Mateo, Calif. 94401. 415-343-3900.

Software utilities

A product said to bring what-you-see-is-what-you-get headline fonts to desktop publishing programs has been announced by **Softcraft, Inc.**

The **Display Font Pack** provides a set of Hewlett-Packard Co. soft font format fonts in a variety of typefaces. Matching screen fonts are provided for Xerox Corp.'s Ventura Publisher and Aldus Corp.'s Pagemaker programs.

Fonts provided include sans serif bold, shadow, contour and outline in 24 and 30 points; classic bold, outline and three-dimensional in 24 and 30 points; initial capitals in 24 points; and Old English in 14, 24 and 30 points. The fonts can be used in portrait or landscape orientations.

The Display Font Pack costs $95.

Softcraft, Suite 201, 227 N. El Camino Real, Encinitas, Calif. 92024. 619-944-0151.

A program that runs under Microsoft Corp.'s Windows environment to provide personal computer users with access to data from minicomputers and mainframes has been announced by **DB/Access, Inc.**

Called **View/PC**, the software is said to allow users to bring files or selected data from host data base systems down to the personal computer for viewing on-screen or for direct access by applications such as Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase or Microsoft's Excel.

View/PC runs on IBM Personal Computer XTs, PC ATs, Personal System/2s and compatible systems. The package costs $250.

DB/Access, Suite 200, 20111 Stevens Creek Blvd., Cupertino, Calif. 95014. 408-255-2920.

Data storage

A 50M-byte internal hard disk drive for Apple Computer, Inc.'s Macintosh II computers has been introduced by **Jasmine Technologies, Inc.**

The **Innerdrive 50/II** reportedly provides 26-msec access times. The vendor said the drive also comes with 9M bytes of public domain software, shareware and backup software as well as a mounting bracket, cables and all hardware necessary for installation.

The Innerdrive 50/II costs $999. A 90M-byte version, announced in August, costs $1,499.

Jasmine also announced the **Innerdrive 40/SE**, a 40M-byte internal hard disk drive for the Macintosh SE priced at $999.

Jasmine Technologies, 555 De Haro St., San Francisco, Calif. 94107. 415-621-4339.

Printers/Plotters/Peripherals

A 15-in. color monitor featuring automatic frequency scanning from 22 to 50 KHz horizontal and from 50 to 80Hz vertical has been announced by **Idek America, Inc.**

The **Spectrasync 1550+** supports the IBM Personal System/2, IBM Personal Computer AT and the Apple Computer, Inc. Macintosh II.

Idek's *Spectrasync 1537*

According to the vendor, the monitor also supports IBM Enhanced Graphics Adapter, Video Graphics Array and Multiple Color Graphics Adapter standards as well as noninterlaced versions of the IBM 8514 graphics standard.

Features include graphics resolution to 1,024 pixels by 800 lines and seven switchable colors.

The Spectrasync 1550+ costs $1,299.

Idek also announced the Spectrasync 1537 and the Spectrasync 1437, which are 15- and 14-in. monitors, respectively. According to the vendor, they offer automatic scanning from 15.5 to 37 KHz horizontal and 50 to 90Hz vertical. The 1537 costs $995, and the 1437 costs $849.

Idek America, 204 S. Olive St., Rolla, Mo. 65401. 314-364-7500.

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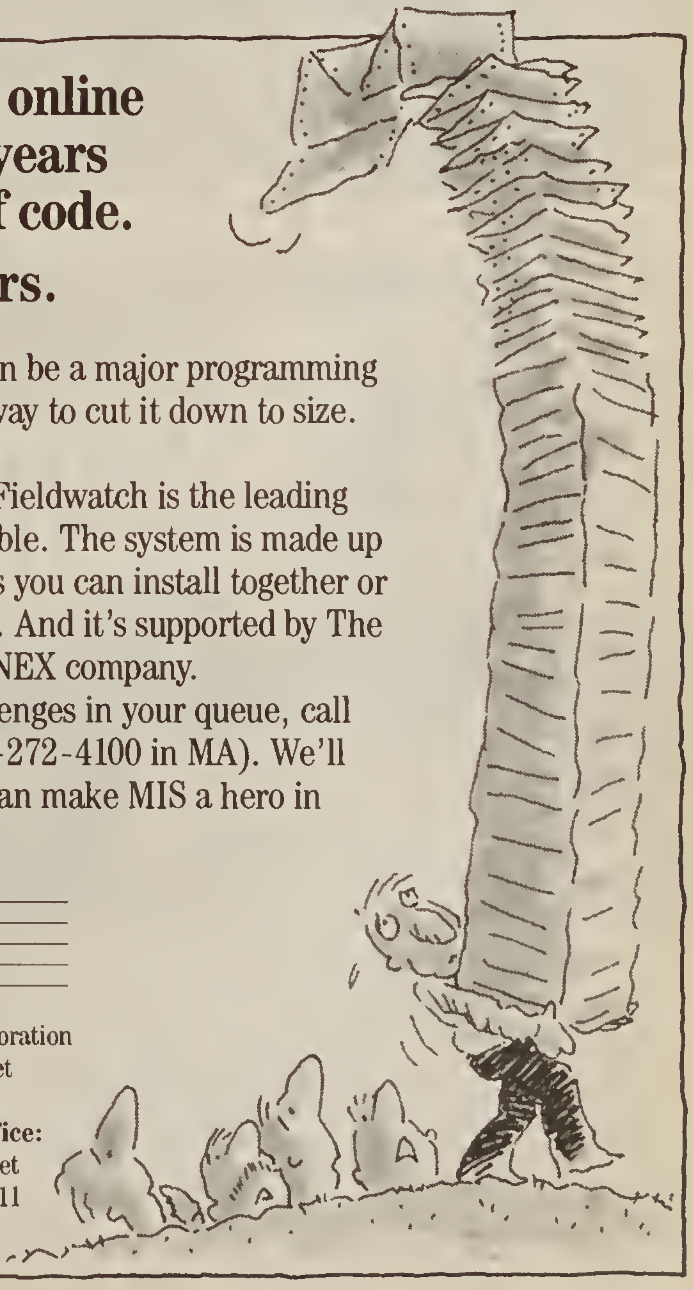

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NETWORKING

DATA STREAM

Elisabeth Horwitt

LANs need bridge work

Now that local-area networks have finally won their place in the corporate computing environments — even if most LANs only link five or six micros — many firms are taking the next step of linking multiple LAN sites through network bridges.

A recent study by The Diebold Group in New York showed that from 1986 to 1987, LAN bridge installations grew by 85% in the industrial sector and almost doubled in the service sector. And according to Forrester Research in Cambridge, Mass., all types of network interconnections will see significant growth in the next three years (see chart page 40).

Vendors' latest bridge products and enhancements address this growing need to integrate multiple LANs into a corporatewide networking system. But beware: There are still plenty of older, simpler products left on the market.

Your basic bridge is essentially a transparent device that takes all transmissions on its local network and sends them out over a link to one or more remote LANs. Unlike a router, designed to support just one network protocol, such as DEC's Decnet or Transmission Control Protocol/Internet Protocol, a bridge is protocol-independent — which can be a plus for companies whose networks

Continued on page 40

IBM ups the telecom ante

Plays strong hand with T1, packet-switching additions; eyes PS/2 Netview

BY ELISABETH HORWITT
CW STAFF

Continuing its quest for dominance in the telecommunications arena, IBM recently announced major upgrades and additions to its T1 switch and packet-switching product lines.

The latest versions of IBM's X.25 NCP Packet Switched Interface (NPSI) are said to offer a 40% performance increase over the older version as well as support for IBM's newly announced 3745 communications processor. NPSI provides an interface between IBM Systems Network Architecture (SNA) devices and a CCITT X.25 packet-switching network. One-time charges for the NPSI Versions 2 and 3 start at $12,000; shipment is set to start in December.

IBM also made SNA X.25 Interconnection (XI) a standard product rather than part of its Request for Proposal program. XI is said to support X.25 communications across an SNA backbone of IBM communications controllers, including the 3745. One-time charges start at $15,120; shipping dates range from June to October.

Net alert! Net alert!

Also announced was the X.25 SNA Network Supervisory Function (NSF), which is said to allow an IBM MVS host running Netview to collect network alerts and performance information from X.25 devices attached to an SNA network. One-time charges begin at $12,000; Release 1 is scheduled to ship in June.

Ellen Hancock, general manager of IBM's Communication Systems Division, reaffirmed IBM's intentions to develop a "graphics-based, Personal System/2-based Netview solution."

Among the first products to be supported by the system, IBM said, will be Network Equipment Technologies Corp.'s (NET) Integrated Digital Network Exchange (IDNX) T1 switches, as resold by IBM. The workstation would also allow IDNX network events to be forwarded as SNA alerts to Netview via the Netview/PC in-

Continued on page 44

SEOUL TRAINING

PC net goes for the gold

CHRIS DEMAREST

BY ALAN ALPER
CW STAFF

Behind the scenes of NBC's coverage of the 1988 Summer Olympic Games in Seoul, South Korea, a network of 120 personal computers will be running the show. The complex setup will help producers and support staff track everything from videotapes and NBC personnel to athletes' biographies and Olympic history.

Designed around two Novell, Inc. file servers and a Digital Equipment Corp. Microvax II, the micro network was developed by Nesbit Systems, Inc., a Princeton, N.J., consulting firm. It is currently installed at NBC's Rockefeller Center headquarters in New York so that employees can learn the

Continued on page 41

Touch ports OSI to Mac

ANAHEIM, Calif. — Touch Communications, Inc. recently announced what it claimed is the first Open Systems Interconnect (OSI) product for Apple Computer, Inc.'s Macintosh.

The Touch OSI Macintosh Developers Kit is designed to "get corporate and third-party developers started" integrating new or existing Macintosh software with OSI networks, Touch manager of product marketing Andrew Lauta said. Developers can then link such applications with an OSI network of Digital Equipment Corp. VAXs and IBM Personal Computers, he added. Touch already markets OSI suites for these systems.

The kit includes all seven OSI protocol layers, including the File Transfer and Access Management service, and prewritten user utilities for filing and remote printer access, Lauta said. It costs $545 and is set to ship in May.

The vendor also announced a new version of Touch OSI DOS, which is said to enable users to load OSI software directly onto a 3Com Corp. Etherlink Plus controller board. The board-resident OSI software is said to use 75% less PC main memory than the previous product, leaving the PC freer to run applications.

Priced at $495, Touch OSI DOS is available now.

Inside

- Excelan adds Ethernet controller board for Unibus machines. Page 45.
- Port contention system ups host access. Page 45.

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Horwitt

CONTINUED FROM PAGE 39

support a variety of protocols. And by ignoring higher level protocols, bridges achieve up to 100 times the throughput of a router, vendors claim.

But a router has one big advantage: It can read headers that a networking system uses to designate to which of several possible LAN addresses it should send a packet. In contrast, the bridge must broadcast a transmission along all available links until it reaches the right LAN. This catch-as-catch-can routing method can be costly in bandwidth to companies that use dedicated lines to link dozens or even hundreds of LAN sites.

Fortunately, these problems are being partially addressed by bridge vendors, such as Vitalink Communications in Mountain View, Calif.; Bridge Communications, also in Mountain View; RAD Network Devices in Rochelle Park, N.J.; and TRW Information Networks in Torrance, Calif. Among the useful features that are increasingly becoming standard for bridge products are the following:

- Filtering allows the bridge to send out over the link only packets that meet certain criteria — for example, only packets addressed to a remote LAN or only Decnet packets.
- Memorizing locations allows the bridge to send a packet directly to the right LAN. Bridge's newer products, for example, only broadcast the first time they send to a given node; once a message is acknowledged, they have a record of that node's address.
- Traffic management includes balancing traffic loads among alternate routes between LANs, diversion of traffic to a backup line when the primary link goes down and the ability to determine the speediest of several alternate routes between LANs.

Making the LAN-to-LAN connection

Users will increasingly need bridges to link separate LANs; gateways will connect different networking environments

	Value of U.S. shipments				
Span types	1987	'88	'89	'90	'91
Repeaters[1]	$5M	$8.8M	$13.1M	$22.2M	$20.5M
Bridges	$15M	$34.3M	$70.7M	$88.6M	$164.1M
Routers	$15M	$23.1M	$46M	$73.8M	$118.3M
Gateways[2]	$23M	$26.3M	$67.8M	$150.4M	$242M

[1] Regenerate LAN signals

[2] Link different types of networks

INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Wellfleet Communications in Bedford, Mass., and Halley Systems in San Jose, Calif., have recently come up with hybrid products that provide a router's direct addressing capabilities for a limited number of networking protocols and a bridge's protocol transparency for protocols they don't support directly. The devices are also said to allow multiple LANs and digital private branch exchanges to share the same 1.5M bit/sec. T1 link via an interface to a T1 switch.

Pushing the envelope

But while the products described above help users conserve bandwidth through more efficient LAN-to-LAN connections, most fail to extend the LAN's 4M to 10M bit/sec. throughput over long-distance links.

Today, 9.6K or 64K bit/sec. lines are adequate to support limited file-transfer or terminal-to-host sessions. But true LAN speeds will be required as companies start interconnecting cooperative processing networks of engineering and computer-aided design workstations and as IBM brings out more of its distributed networking scheme, based on the LU6.2 and PU2.1 protocols.

IBM deserves credit for taking the lead in high-speed interconnectivity with its Jan. 26 announcements. First, the vendor introduced ACF/NCP programs with PU2.1 support that allow its communications processors to link various IBM and non-IBM networking environments with minimal interference from an IBM host. Second, IBM brought out the 3745 communications controller, which it claims supports up to eight active T1 lines and an effective throughput of 9M bit/sec. [CW, Feb. 1].

With a base price of $125,000 (as compared with a typical bridge price tag of $6,000 to $20,000), the 3745 clearly needs to do more than connect up to eight IBM Token-Ring networks — however speedily — in order to earn its keep. And so it does. Acting as a gateway, the 3745 can connect LANs to up to 16 IBM hosts.

Devices and LANs connected to an IBM Systems Network Architecture backbone of 3745s can also be given access to a CCITT X.25 packet-switching network. The 3745 also offers reliability features such as IBM Netview support and a second processor that can be used as a backup system.

Take all these features together, and the 3745 could prove just the ticket for IBM shops that are in the process of integrating their LANs into a peer-to-peer SNA network.

Horwitt is a *Computerworld* senior editor, networking.

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PC net

FROM PAGE 39

ins and outs of file server and Microvax technology before the equipment is shipped to Seoul in July.

Since beginning the project almost three years ago, Nesbit has worked closely with NBC's MIS department to assure the network that once the Olympics are over, the file servers and the Microvax can be used in other capacities by the cost-conscious General Electric Co. subsidiary (see story below). And cost efficiency is especially important in the case of these Olympics — NBC paid the Olympic committee more than $300 million for the rights to cover the games.

The Ethernet network will eventually reside in the International Broadcast Center in Seoul, which was designed by NBC specifically for the Olympic Games. The network operates under Novell's Netware 2.1 networking software, allowing data to be transmitted at 10M bit/sec. over standard and thin Ethernet cable. The Microvax will attach to the network via a Transmission Control Protocol/Internet Protocol interface. Teleprompters used by on-air personnel will be linked to dedicated micros on the network for script preparation.

Two 9.6K bit/sec. leased lines will enable employees in the field using laptop PCs to call in results from remote venues to the Microvax. Seoul and NBC's New York headquarters will use the CCITT X.25 packet-switching protocol to exchange data — such as altered travel plans — at rates of 64K bit/sec. over two dedicated T1 lines.

Why a PC network?

The micro network approach was taken for a number of reasons, according to Irene Nesbit, president of the consultancy that helped design the network and a developer of the systems requirements for NBC's canceled coverage of the 1980 Moscow Summer Olympics.

File servers, Nesbit stresses, are more compact than minicomputers and are therefore easier to both transport between New York and Seoul and maintain during the 21 days of Olympic events. PC workstations can also be more easily adapted to changing requirements than terminals, she says.

"We're dealing with pretty smart users. They're all computer-literate; they know Lotus and Multimate," Nesbit points out. "We want to allow them to work in a way they are accustomed to."

"This is the most cost-effective solution," adds Michael Zablocki, NBC Sports' Olympics systems manager and the liaison between Nesbit and NBC's MIS organization.

From a mix of IBM Personal System/2 Model 30s and Personal Computer ATs — equipped with 3Com Corp. Ethernet cards — users will be able to access a variety of services, including a videotape library system, a manpower scheduling system, a logistical support system, electronic mail and The Associated Press news wire.

In addition, Lotus Development Corp.'s 1-2-3 spreadsheet and Multimate International Corp.'s Multimate word processing program will be downloaded from the file server or booted locally, Nesbit adds.

All applications on the network will be accessed through a menu system that can be tailored to the needs of each type of user. Multiple security levels are built into the system to allow users access to applications required for their jobs, she says.

The two file servers will be equipped with 109M-byte drives that can be upgraded as required to access a maximum of 8G bytes, Nesbit says. Two dedicated micros will act as a bridge between the file servers, allowing users on one to pass data back and forth depending on the network's load. There will be a fair degree of redundancy on the network with duplicate drives, boards and controllers as well as an uninterruptible power supply.

"The only thing that will stop the network from working is if the cable is cut," Nesbit notes.

The networked systems

The library system, which was written in C, will allow producers to monitor the whereabouts of every videotape needed for the broadcast. A bar code will be affixed to each tape and scanned into the system. Softcraft, Inc.'s Btrieve — a file handler for C — will manage the 25,000 records expected to be part of this application, Nesbit notes.

The logistical support system will be used to keep track of detailed personnel information, including hotel and airline reservations for the 3,500 NBC employees covering the games. The system, developed with Ashton-Tate Corp.'s Dbase III and compiled with Nantucket Corp.'s Clipper, will generate a variety of ad hoc reports based on 25 different parameters, such as names, phone numbers, departure times and so on. Five different types of financial accounting reports can be run to help NBC keep a handle on costs, Nesbit says.

The manpower system was developed to monitor equipment use and personnel schedules. Written with the same tools as the logistics system, it will maintain schedules in quarter-hour increments, tracking each person in NBC's production and engineering groups.

The system will display the location of each individual and piece of equipment during the Olympic Games and will flag the user if any conflicts in scheduling occur. It also contains report capabilities, enabling schedulers to ascertain who or which piece of equipment is available for each job.

A general research system, residing on the Microvax, is already in use at NBC. It is functioning as a repository of athlete biographies, Olympic rules and the histories and results of recent athletic events. A general text-retrieval software package, Statis, written in Fortran by Computer Power, Inc., was used to organize the information.

The research system is being used to provide information for producing biographies of some athletes before the games and will be used during appropriate points in the broadcast to feed announcers insightful tidbits. "The goal is to provide information on who may do well in the Olympics and, therefore, who to cover during the broadcast," Nesbit points out.

Built-in user prompting

Developing a micro network is very different from creating stand-alone applications, notes Ken Michielsen, Nesbit's projects director. "You have to have a finer understanding of what the user needs to do," he says.

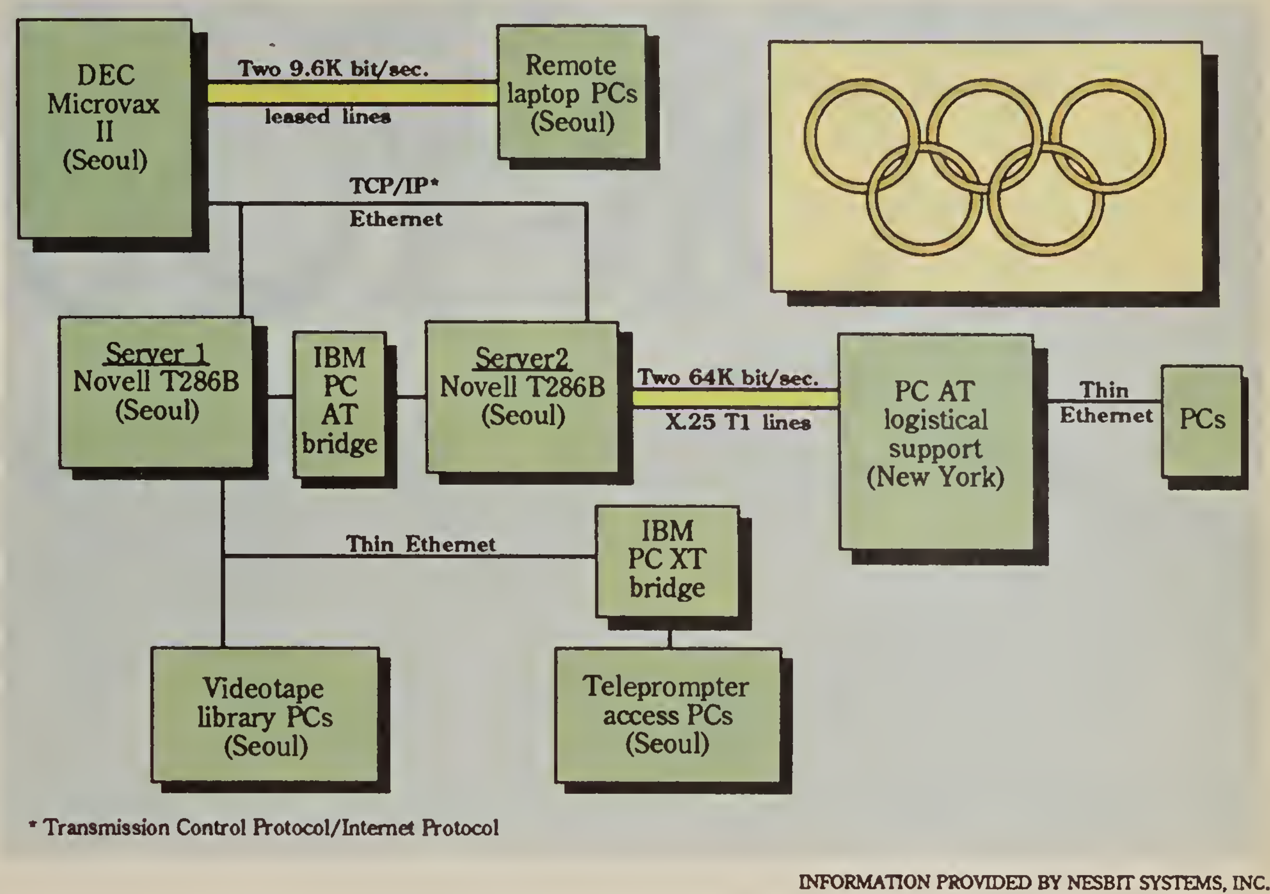
In that regard, Nesbit Systems has built some user prompting into the system. For example, if two users of the logistics application access the same file simultaneously and update information, the system will ask the last user to exit the file if he wants to see the new information before ending the session.

Covering the Olympics is almost a 24-hour-a-day, three-week grind for NBC. That's why Nesbit and company have spent the better part of the last three years working with NBC producers, engineers and users in planning the micro network. During that time, Nesbit and her staff have defined equipment requirements, written code, tested the applications and assembled a pilot network first at the consultancy's Princeton headquarters and late last year at NBC.

"We even worked closely with the building people in Seoul so that we have the cabling and drops where we need them," Michielsen says.

Let the Games begin

A basic schematic of NBC's personal computer network linking New York and Seoul, South Korea for Summer Olympic coverage


DEC Microvax II (Seoul)
Two 9.6K bit/sec. leased lines
Remote laptop PCs (Seoul)
TCP/IP*
Ethernet
Server 1 Novell T286B (Seoul)
IBM PC AT bridge
Server2 Novell T286B (Seoul)
Two 64K bit/sec. X.25 T1 lines
PC AT logistical support (New York)
Thin Ethernet
PCs
Thin Ethernet
IBM PC XT bridge
Videotape library PCs (Seoul)
Teleprompter access PCs (Seoul)

* Transmission Control Protocol/Internet Protocol

INFORMATION PROVIDED BY NESBIT SYSTEMS, INC.
CW CHART

NBC's MIS still runs the show

Although NBC has relied on a consultancy to develop a microcomputer network to help manage its coverage of the Summer Olympic Games in Seoul, South Korea, the firm's MIS department has been involved every step of the way.

"We met with [MIS] from the beginning and supply them with status reports on a weekly basis," notes Irene Nesbit, president of Nesbit Systems, Inc., the consulting firm doing the work for NBC. "MIS reviews everything we do; anything that has to do with computers must be approved by them, since all the equipment will come back to the department."

By hiring a consulting firm, NBC's MIS department did not have to add staff and then find work for them after the Olympics project is finished. "Now that we're owned by General Electric, we have to demonstrate incredible efficiencies," says Michael Zablocki, NBC Sports' Olympics systems manager.

Although NBC originally intended to purchase the networked micros, it has now opted to rent them because of logistical problems. "We have the [PC] network installed here [30 Rockefeller Center in New York] for 70 users to train on prior to setting up in Korea," Zablocki explains. "People will need to use some of the same equipment in South Korea during that time, so we need a duplicate setup and felt renting the PCs would be easier than shipping them back and forth."

The file servers will be purchased and will initially return to MIS at the Olympics' conclusion. "It's part of GE's — and other businesses' — philosophies to distribute lists of equipment to divisions that can then bid on it through MIS," Zablocki says. "It's then charged back to the budgets of those divisions which place the winning bids."

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Avanti aims cost-effective links at remote sites

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — A family of network concentrators and multiplexers announced recently by Avanti Communications Corp. were designed to provide small remote sites with more cost-effective links to a backbone wide-area network of Avanti T1 switches.

The Open Network Concentrator (ONC) family, introduced here at Communication Networks '88, or Comnet, is the first product line of this type that can fully interface with Avanti's Open Network Exchange (ONX) family of T1 switches and network management systems, according to George Kushin, the company's vice-president of marketing.

Avanti was one of many T1 vendors that introduced enhancements and additions to their lines at Comnet [CW, Jan. 18]. The products represent vendors' "desperate attempts to differentiate their products in an overcrowded market" and also to become customers' single point of purchase for networking systems, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp.

Avanti's products will reportedly provide users with the ability to use one network management system for both the high-end ONX T1 switches and ONC multiplexers.

February releases

Scheduled for shipment this month, Avanti's introductions include the following:

- ONC-100, a T1 multiplexer that supports up to 24 channels between a remote site and an Avanti ONX T1 switch.

A version of the product conforms to the Enhanced Subrate Digital Multiplexing standard, allowing users to route individual lines to carrier-based services that also comply with the standard, according to Kushin. Price ranges from $10,700 to $28,000.

- ONC-50, which is similar to the Series 100 except that it multiplexes a 56K bit/sec. AT&T Dataphone Digital Service channel rather than a 1.5M bit/sec. T1 circuit. It is priced at approximately $4,500.
- ONC-200, an upgraded version of Avanti's Ultramux that was enhanced to be compatible with the ONX network management system. It is priced from $25,000 to $50,000.
- ONC-10, which gives two high-speed devices — for instance, 256K bit/sec. computer-aided design (CAD) workstations — the ability to share a single T1 circuit.

Avanti also introduced four Network Extension Units that act as line drivers to extend line speeds of up to 3M bit/sec. out to CAD workstations and other high-speed applications over a distance of up to several miles, Kushin said.

Without such devices, line speeds of 256K bit/sec. or higher can be extended over a distance of only about 50 feet between the T1 switch and the user device, he noted.

IBM

FROM PAGE 39

terface. IBM also said it is developing an integrated network management data base based on DB2.

IBM's version of the IDNX product line will support 45M bit/sec. T3 networking as soon as NET provides this capability, IBM said. NET recently issued a statement of its intent to incorporate T3 capabilities into its products.

IBM also announced an upgraded version of the 3737 Remote Channel-to-Channel Unit. Model 002, which supports host-to-host links over up to two T1 channels, will replace the older 3737, which supported only a single T1 link. Priced at $76,680, Model 002 is scheduled for June shipment.

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NEW PRODUCTS

Local-area network hardware

An Ethernet controller board for Unibus-based computers has been announced by **Excelan, Inc.**

The board, called **Exos 304**, uses Intel Corp.'s 80286 microprocessor as an on-board CPU. It runs Excelan's Transmission Control Protocol/Internet Protocol software and contains such networking applications as file transfer, terminal emulation and electronic mail. It costs $3,520.

Excelan also announced that it has reduced the price of its Exos 204 Unibus controller board to $2,120.

Excelan, 2180 Fortune Drive, San Jose, Calif. 95131. 408-434-2300.

A multiport repeater for Ethernet networks has been announced by **American Photonics, Inc.**

The **RL7100** consists of the RL7100L local multiport repeater, which interconnects up to eight RG-58 thin coaxial Ethernet segments and allows connection to a standard thick coaxial backbone.

The RL7100R remote multiport repeater provides all of the features of the local version but adds a fiber-optic interface.

The RL7100L costs $2,450; the RL7100R costs $3,150.

American Photonics also introduced the RL7000L Ethernet thin-net repeater. It includes a built-in transceiver and allows for connection of one thin-net branch to a standard Ethernet backbone. It costs $975.

American Photonics, 71 Commerce Drive, Brookfield Center, Conn. 06805. 203-775-8950.

Customer-premise equipment

A personal computer add-in card said to allow remote communication of computer-aided design (CAD) data has been announced by **Gammalink.**

Called **CAD-Fax**, the card allows users to distribute or collect design information via facsimile through a high-speed computer-to-computer file transfer or by means of an integral Hayes Microcomputer Products, Inc.-compatible modem.

CAD-Fax can read Autodesk, Inc.'s Autocad ADI printer/plotter files and Hewlett-Packard Co. GP Graphics Language plot files. CAD-Fax automatically divides each CAD document into 8½-in.-wide stripes of any length and inserts alignment markers so the recipient can reconstruct the original full-size drawing.

CAD-Fax costs $1,995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303. 415-856-7421.

An automatic port contention system designed to expand accessibility to host computer ports has been introduced by **Backus Data Systems, Inc.**

The **COP/APC** port contention system provides system security by answering off-site calls via modem ports, hanging up and returning the call to the phone number listed in the security directory. When all computer ports are busy, the call can be placed in a call-back queue.

The device provides connections between host computers, local terminal devices, modems and other communication resources. It is expandable from eight to 152 ports and can be used for switching between multiple facilities and resources.

Prices range from $5,200 to $18,500.

Backus Data Systems, Suite 110, 1440 Koll Circle, San Jose, Calif. 95112. 408-279-8711.

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HARD TALK

James Connolly

Apple, DEC tap techies

So much attention has been focused on the implications for the commercial MIS world of DEC's alliance with Apple that people seem to forget that the match could be still more meaningful in the engineering and scientific markets.

It may turn out that the greatest impact of the DEC-Apple agreement to jointly develop connectivity products will be in the technical computing arena in which DEC built its reputation.

This does not mean that the Maynard, Mass., minicomputer pioneer and the Cupertino, Calif., microcomputer innovator cannot achieve their goal of leveraging their agreement to sell general-purpose systems for office automation or traditional MIS applications. MIS and OA in large companies represent growth opportunities for both Apple and DEC.

Looking beyond MIS, one can see that DEC and Apple can help each other solidify their existing positions of strength, which tend to lie in technical computing environments. In addition, reinforcing their scientific and engineering positions can help DEC and Apple in the commercial world, because many of their technical users are in the same Fortune 500-class organizations that are the scenes for DEC's and Apple's MIS battles with IBM.

Continued on page 52

Summit market takes shape

Low-end 3090s will survive as IBM courts large users, analyst says

BY JEAN S. BOZMAN
CW STAFF

William S. Husband

CHICAGO — IBM may push large 3090 user sites on a fast track to the 3090 follow-on, known as Summit, while providing four more years of upgrades for current users of low-end and mid-range 3090 machines, according to a leasing firm executive.

"Summit is designed as a high-capacity system that will meet the capacity needs of the top 10% to 15% of the IBM mainframe market today," said William S. Husband, senior consultant to the Meridian Group, a $1 billion Deerfield, Ill., leasing firm, at a recent Chicago seminar.

"It is targeted at high-growth users, not those who are using the IBM 3090 Model 150 or Model 180 machine," Husband said. Summit is directed at high-end users who have already installed one or more 3090 Model 400 or 600 mainframes, he added.

Summit is expected to appear by late 1990 with more than 200 million instructions per second (MIPS) of power and 2G bytes of main memory in a tightly coupled four-CPU configuration, Husband said. By 1994, it should run at more than 800 MIPS through the use of 16 CPUs on two frames, he added. It is expected to have a 60-MIPS uniprocessor and a top channel speed of 18M byte/sec. Eventually, Summit may address more than 4,000 channels directly — a feature that would allow a large user to centralize several present-day computer rooms at one site.

Meanwhile, the base 3090 will undergo drastic redefinition, Husband said. It will be more powerful and faster and will take up little more space than current models. The 3090 F, G and H models of the late 1980s and early 1990s should also contain features that will boost IBM mainframe reliability to new levels.

"By the mid-1990s, the 3090 mainframe will have taken on the degree of fault tolerance now associated with an [IBM] System/88 or a Tandem Computers, Inc. processor," Husband said.

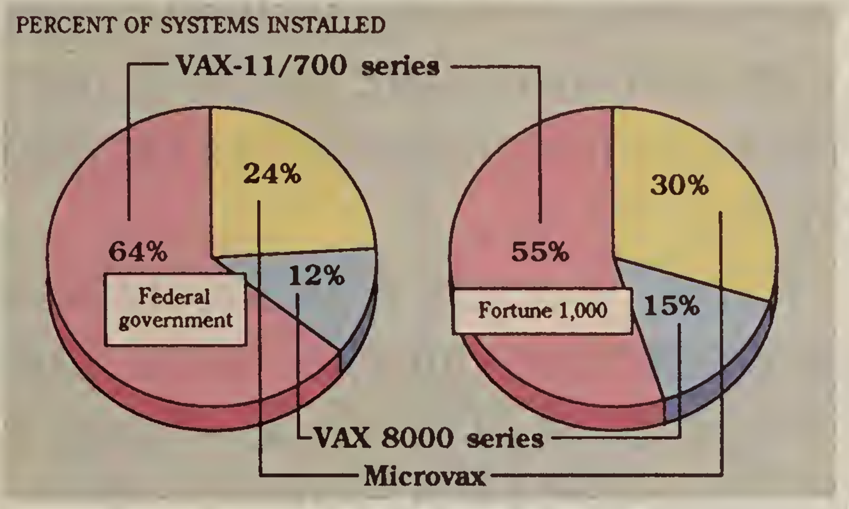
Basic 3090 specifications will also change dramatically, he said. Beginning in April, when the 3090 F is expected to arrive,

Continued on page 51

Data View

Corporations lean toward new VAXs

Large companies commit to DEC VAX 8000 and Microvax series faster than the government does



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

SCS unwraps near-super

SAN DIEGO — Scientific Computer Systems Corp. (SCS) drove down the entry point for its near-supercomputer product line with the announcement recently of a lower priced system designed to be upgradable to the firm's SCS-40.

The low-end system is the SCS-30/XM, which the company said provides 75% of the SCS-40's performance for 60% of the price.

SCS positioned the new system as an entry-level near-su-

Continued on page 52

Tandem adds IPI subsystem

CUPERTINO, Calif. — Tandem Computers, Inc. recently doubled the data transfer rate and storage density of its mid-range disk subsystem offering with the introduction of the V80 Disk Storage Facility.

The subsystem is intended for use in the same markets served by Tandem's earlier V8 subsystem, which provided an unformatted capacity of 1.3G bytes in combination with Tandem's Nonstop II, VLX, TXP, EXT25 and EXT10 systems.

The subsystem houses up to eight 337M-byte 8-in. disk drives in a single cabinet to provide a formatted storage capacity of 2.1G bytes. The V80 includes Tandem's new 3120 Disk Controller, which features an ANSI-standard Intelligent Peripheral Interface (IPI) for a 2.4M byte/sec. parallel data transfer rate. The company positioned the V80 below the high-end, 4.2G-byte Tandem XL8 subsystem.

The IPI interface is built into a printed-circuit board that acts as a backplane in the V80. The disk drives are built by Fujitsu Ltd.

Available now, the V80 costs $62,000 with four disk modules and $87,000 with eight. Each 3120 controller costs $20,000.

Inside

- TI revamps Business Systems. Page 51.
- Xerox offers ion deposition printer. Page 52.
- Unbound rolls out line of Q-bus optical disk systems. Page 53.

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Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

TI gives Business Systems a face-lift

BY SUZANNE WEIXEL
CW STAFF

AUSTIN, Texas — Trying to keep pace with current technology without abandoning users of its older systems, Texas Instruments, Inc. recently revamped its Business System series of multiuser computers.

Five models have been introduced, replacing the mid-range and supplementing the high end of the series.

According to a company spokeswoman, the 17-year-old Business System series was in need of updating, but with an installed base of more than 100,000 systems, TI did not intend to discontinue the line.

Smoothes migration path

In addition to upgrading the Business System line, the changes simplify the migration path to TI's industry-standard System 1000 series, according to the spokeswoman.

The Business System series is based on a proprietary operating system and chip set, while the System 1000 series uses Intel Corp. processors and the Unix operating system. With the changes, both series will support the same peripherals, including hard drives, tape backups and terminals, she said.

Additions to the Business System series include the 677A and 677S mid-range models and the 877A, 877B and 877S high-end models. All the new Business System models feature a 182M-byte, 5¼-in. Winchester disk using small computer systems interface technology as well as a 60M-byte cartridge tape backup.

The 677A and 677S are configured using TI's 990/10A processor. They offer 1.5M bytes of random-access memory, which is expandable to 2M bytes. The 677A, priced at $21,495, comes with a Model 931 terminal. The 677S, which costs $20,995, has a Model 924 terminal.

The Business Systems 877A, 877B and 877S use TI's 990/12 LR processor with a 1M-byte cache memory controller and a 512K-byte memory array. All feature a four-channel communications interface for terminal connection. The 877A, priced at $32,995, comes with two Model 931 terminals; the 877B, which costs $33,595, comes with two Model 931 terminals; and the 877S, priced at $31,995, has two Model 924 terminals.

The systems are available immediately.

Models retained from the current family are receiving price reductions, TI said. They include the low-end System 373A and System 374A, which will sell for $11,495 and $13,495, respectively, and the high-end 891A, 891B and 891S, which have been reduced to $51,995, $52,595 and $50,995, respectively.

According to the spokeswoman, users of older models are being offered incentives to upgrade to the new models.

DG rolls out rack-mounted systems

WESTBORO, Mass. — Adapting its entry-level Eclipse MV/1400 system for use by value-added resellers and system integrators, Data General Corp. recently unveiled a rack-mounted version, the Eclipse MV/1400RM.

The MV/1400, announced last spring, can support eight users with memory that can be expanded from 4M to 8M bytes, the vendor said.

DG also announced an enhanced version of its previously available rack-mounted MV/2000RM in which the base memory has been upped to 4M bytes, expandable to 12M bytes. The MV/2000RM can support 24 users, according to DG.

Each computer occupies seven inches of vertical rack space and is mounted on slides for ease of maintenance, the vendor said. The rack-mounted systems come with an optional streaming-tape subsystem.

List prices for the MV/1400RM begin at $9,995 for a system with 4M bytes of memory, 38M bytes of disk storage, 737K bytes of floppy-disk storage and an operating system license. The MV/1400RMT, which includes a streaming-tape subsystem, is priced at $18,370.

The MV/2000RM lists at $19,150; with a streaming-tape subsystem, the product is priced at $27,525.

Summit

FROM PAGE 49

the 3090 will get channel speeds of 4.5M and 6M byte/sec., a 24-MIPS uniprocessor, serial I/O channels based on fiber-optic technology and large amounts of extended memory. By 1992, a 37-MIPS uniprocessor is expected.

"The major thing that's changing in the 1990s is the channel itself," Husband asserted. "I would not be surprised to see IBM repackage the channel interfaces to the processor now, as a way of providing a platform for a user's final conversion to fiber-optic channel technology." The 3090 F models will initially have 6M byte/sec. channel speeds, he said, while the 3090 G models, expected in late 1989 or early 1990, will have channel speeds of up to 9M byte/sec.

A separate I/O processor — a sort of fifth wheel — will drive the new serial channels through an outboard computer as powerful as a 3090 Model 200. The outboard I/O driver will be capable of multiplexing data that is traveling at different speeds between a user's CPUs and disk drive units. It will need to do that, Husband said, since different computers will send data to disks at different speeds. Distances between CPUs and disk drives will also be changing, with users able to store data as much as one mile away from their IBM mainframe room.

Husband said he expects that a single site might be using a 9M-byte/sec. channel speed for its 3090 G models while the same user's follow-on to the IBM 4381 might send data at 4.5M or 6M byte/sec.

Future 4381 machines may run at speeds of 15 to 21 MIPS, eclipsing today's low-end 3090 Model 120s, 150s and 180s, according to Husband.

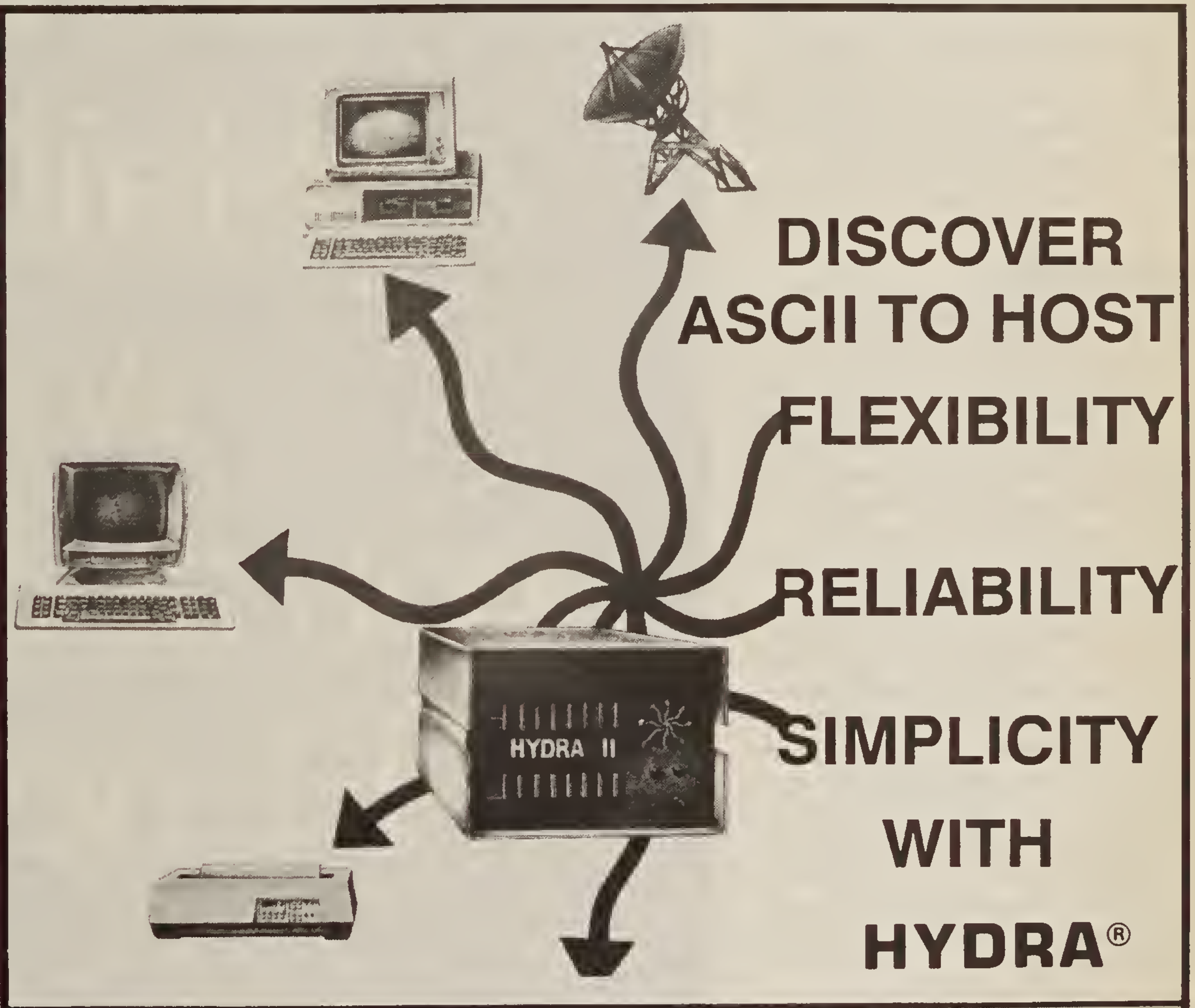
Even the IBM Personal System/2 or its successor could, through future enhancements, send data to disk at 3M byte/sec., Husband said.

Expanded options

Significantly, the 3090's Expanded Storage feature will be enhanced through features embedded in what is commonly called MVS/XB and is the expected successor to IBM's MVS/XA. However, the full functionality of MVS/XB may not be realized until 1989, when IBM ships a version that fully supports Expanded Storage.

"Today, Expanded Storage is a high-speed paging device, which is not the function IBM said it would have when it was introduced in 1985," Husband told his audience of 50 MIS professionals. "Users still do not have the tools to be able to exploit it."

Husband contended that, in general, IBM does not want to make obsolete a profitable computer line by accelerating the addition of features. "IBM may be a leader in the lab, but it is not a leader in providing new products to the market," he said. "Maybe that will change as IBM reacts to their revenue problems of the last three years."



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Near-super

CONTINUED FROM PAGE 49

percomputer alternative to the high-end of Digital Equipment Corp.'s VAX line of superminicomputers.

The SCS-30/XM is available with up to 1G byte of SCS's extended memory, which allows memory beyond 128M bytes to be used as a high-performance I/O device emulating a solid-state storage device. SCS claimed the 64-bit system executes up to 33 million floating-point operations per second (MFLOPS), compared with 44 MFLOPS for the SCS-40. SCS rated the SCS-30/XM at 16 million instructions per second in scalar mode.

Like the SCS-40, the new system uses the Cray Research, Inc. Cray X-MP instruction set and supports Cray's CTSS and COS operating systems as well as SCS Scenix, which is the vendor's implementation of AT&T's Unix System V, Release 3.

An upgrade to an SCS-40 involves a board swap in the field, according to an SCS spokeswoman. The base price of an SCS-30/XM with 1G byte of memory, a disk drive and a controller is $371,000. Shipments are scheduled to begin during the second quarter.

Connolly

CONTINUED FROM PAGE 49

DEC's history in the scientific and engineering fields is well known. Users in those areas committed early and stayed with minis. They also tended to commit to Apple's Macintosh and its icons earlier than most commercial users, with the most notable exceptions being the large accounting firms that bought Macintoshes for commercial applications.

There was something about the Mac that attracted the technical user; even two or three years ago it was the Mac, not the IBM Personal Computer, that was showing up on the desks of engineers and computer scientists. Today, it isn't unusual to see a technical user running a Mac alongside a Sun or Apollo workstation. Indeed, computer architect Gordon Bell, designer of DEC's VAX, is a dedicated Macintosh user.

Now, if DEC is serious about promoting the Mac for the desk top — or at least welcoming the Mac — DEC will have a more unified offering than it does now, and Apple will have a key to many more doors.

The DEC-Apple venture comes at a time when IBM is working hard to promote its 370 architecture processors in technical computing. That means DEC and Apple will be paired up against combinations of the IBM Personal System/2 — or, less frequently, the IBM RT Personal Computer — and IBM 9370s and 4381s. There are no guarantees that DEC and Apple will win those competitions, even in the technical computing environments. But both DEC and Apple have a chance to make some headway, or at least blunt IBM's own offensive.

So even when MIS remains reluctant to move to DEC or Apple, there is a good chance that the engineering side of the house will be taking a closer look at those vendors.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Xerox adds ion deposition printer

EL SEGUNDO, Calif. — Xerox Corp. late last month drove its ion deposition printer product line into the range of its high-volume laser printer family with the introduction of a 75 page/min ion deposition printing system.

The 4075 is intended for use as an entry-level electronic printer in medium-size to large data centers.

In ion deposition printing, toner adheres to ion-charged paper to form print patterns.

Analyst Cathy Dingman of the market research firm CAP International, Inc. in Marshfield, Mass., said Xerox's commitment to ion deposition technology as a complementary offering with laser printers is important in view of Xerox's early role in the development of laser technology.

Priced lower than laser printers

In print speed, the 4075 falls between two laser-based Xerox printers, the 70 page/min 8790 and the 120 page/min 9790. However, the new printer features a resolution of only 240 dot/in. compared with 300 dot/in. for the laser systems. The 4075 also costs less, with a base price of $64,495 with an integrated 10M-byte disk drive. The base price for an 8790 is $208,035.

Xerox highlighted the flexibility that the 10M-byte and optional 45M-byte printers provide. The disk can store forms and fonts and merge them with data rather than having the forms and fonts maintained by the host computer, according to Xerox.

The printer can use either cut-sheet or continuous-form paper. It supports Xerox's Host Forms Description Language, which runs on IBM mainframes, and Xerox's Personal Computer Forms Description Language, which runs on IBM Personal Computers and compatibles.

The 45M-byte disk option costs $1,995.

The Xerox 4075 is based on the Delphax Systems, Inc. print engine used in the earlier Xerox 4060 printer.

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NEW PRODUCTS

Processors

A 32-bit board-level system compatible with the VMEbus standard has been announced by **National Semiconductor Corp.**

The **VME532** incorporates the vendor's NS32532 microprocessor. It is compatible with Unix and Ready Systems, Inc.'s VRTX and provides a native debug environment, according to the vendor.

It is also compatible with National Semiconductor's software development tools package.

The VME532 features a 64K-byte external cache expandable to .5G bytes and 16M bytes of dynamic random-access memory on-board.

It also has a four-level memory hierarchy consisting of on-chip instruction and data cache, external cache, local memory and global memory.

Other features include two RS-232C serial ports and an internal timer/counter, the vendor said.

A 20-MHz VME532 with 4M bytes of memory costs $9,900.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052. 408-721-6874.

Trilobyte Computer Corp. has introduced its **Model 4200**, a ruggedized Unix-based system incorporating the Sun Microsystems, Inc. Sun-3 workstation and Trilobyte's IV-B chassis.

The Sun-3/E card set is mounted in the chassis' nine-slot VME card cage, with the optional cartridge tape and hard disk located on the shock- and vibration-isolated platform.

Operating parameters are monitored by the Trilobyte Sentry diagnostic monitor and controller.

The Model 4200 is said to meet the environmental requirements of MIL-STD 810D, MIL-STD 167 and MIL-STD 461.

The basic Trilobyte Sun 4200 Ethernet node with the IV-B chassis, a CPU, a video controller, an Ethernet/small computer systems interface and a Sun Unix operating system costs $27,225.

Trilobyte, 14477 Catalina St., San Leandro, Calif. 94577. 415-895-2244.

Data storage

A line of Q-bus optical disk systems has been introduced by **Unbound, Inc.**

The eight optical systems are based on the vendor's **Qube** desktop Q-bus system package.

They feature 5¼-in. write-once read-many technology and provide users with a choice of MSCP disk or TMSCP tape emulation. Optical disk capacities range from 400M to 800M bytes.

Configuration options include complete Digital Equipment Corp. Microvax II-compatible desktop systems with integral hard disk, TK-50 tape and optical disk or add-on optical subsystem kits with optical controllers.

A typical subsystem configuration includes an 800M-byte 5¼-in. small computer systems interface optical disk in a mini-pedestal or tabletop package with power supply and cooling, according to the vendor.

Prices for the Qube optical systems start at $5,750.

Unbound, 15235 Springdale St., Huntington Beach, Calif. 92649. 714-895-6205.

A universal dual-wide board said to allow Digital Equipment Corp. Microvax computers to operate peripherals as either a DEC TK 50 cartridge or a TU 81E reel-to-reel tape drive has been announced by **Cascade Technology Corp.**

The **Cascade Q/SCSI** host adapter is said to be MU driver-compatible across all DEC operating systems. Firmware permits sequentially organized devices to be attached as TK 50 or TU 81E tape drives and operates transparently with DEC software commands.

It sustains a 2M byte/sec. data transfer rate and provides 18- to 22-bit direct memory addressing, according to the vendor. It also includes a 64K-byte expandable cache buffer.

The Q/SCSI host adapter is priced at $1,695.

Cascade Technology, P.O. Box 1086, Birmingham, Mich. 48012. 313-646-5533.

Printers/Plotters

A plain-paper laser image-setting system has been announced by **Tegra, Inc.**

The **Genesis XP-800** produces both final and proof copy on either letter- or legal-size plain paper. Output resolution is 800 by 400 dot/in. Speed is 8 original page/min.

Typographic features include type sizing from .5 to 1,000 points; electronic slanting, expanding and condensing; and electronic reverse, including kerning in reverse.

Graphics capabilities include rotating images; defining and filling area with tints and patterns; and magnifying and reducing pages.

Graphics can be entered into the Genesis XP-800 on-line or from the Genesis Graphics Subsystem, according to the vendor.

The Genesis XP-800 is priced at $26,950.

Tegra, Middlesex Technology Center, 900 Middlesex Tnpk., Billerica, Mass. 01821. 617-663-7435.

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Object-code only: Is IBM playing fair?

IBM's 5-year-old OCO policy protects its own assets but may threaten customers' investments

NO

MARTIN GOETZ is chief executive officer of Syllogy Corp., a systems software company in Hackensack, N.J. He was previously senior vice-president of Applied Data Research, Inc. and was one of the company's founders in 1959. He is chairman of ADAPSO's IBM Interface Committee and past president of ADAPSO's Software Industry Association.

ILLUSTRATIONS BY ALAN WITSCHONKE

By closing its software architecture through an object-code only (OCO) policy, IBM reduces the opportunities for companies developing complementary and competitive products. The source code vs. object code debate is clearly a competitive issue that will affect IBM's user base.

If IBM's OCO policy is not reversed, IBM users will face higher prices, fewer alternative suppliers, fewer complementary offerings and less innovative products.

Independent software companies have provided alternative solutions by building products that interface in unique ways with IBM's. They have offered more efficient code or new functions that replaced or complemented IBM products. To build these tools, developers have often analyzed IBM's source code to gain information necessary to the connecting program.

In some cases, IBM provided exits and entrances for the interface. But in many cases, depending on the software's function, the actual source code was required.

IBM contends that so-called standard exits and external languages such as SQL, Cobol, JCL or Rexx are sufficient for connecting to and enhancing IBM products. This is incorrect. Exits exist only where IBM anticipates needs, and external languages provide facilities conceptualized during product design and development.

Neither technique supports — or can support — enhancements of basic system structures or facilities that affect many areas of an IBM product. Exits for such enhancements cannot be anticipated and, if provided, would be massively complex.

Unlike hardware interfaces, which are well defined and rigid, programs can interact in infinitely flexible ways. Working with this flexibility, many software companies

Continued on page 58

YES

PETER SCHNEIDER is assistant general manager of development at IBM's Enterprise Systems in Harrison, N.Y. Formerly, he was assistant group executive of systems development in IBM's Information Systems and Storage Group. A graduate of the University of Wisconsin with a Ph.D. in electrical engineering, he joined IBM in June 1966.

IBM's software delivery practice has been in place for five years. If you examine what the company has done in regard to its object-code only (OCO) practice, it is merely following what others have done for a longer time and probably for the same reasons.

IBM believes that making licensed programs available in OCO form is a worthwhile practice because it provides customers with high-quality, functionally complete and easy-to-service software. OCO also enables the company to protect the internal design of its programming from unauthorized copying. IBM's customers and users groups have agreed with the company's goals and support IBM's effort to implement OCO.

More than half of all IBM software in the field is object-code only, and the results to date have been excellent. In those few cases in which specific problems occurred for either customers or vendors, IBM promptly resolved them. The company sees no reason to abandon its OCO goal but remains dedicated to responding to specific implementation problems and making adjustments as required.

Step by step

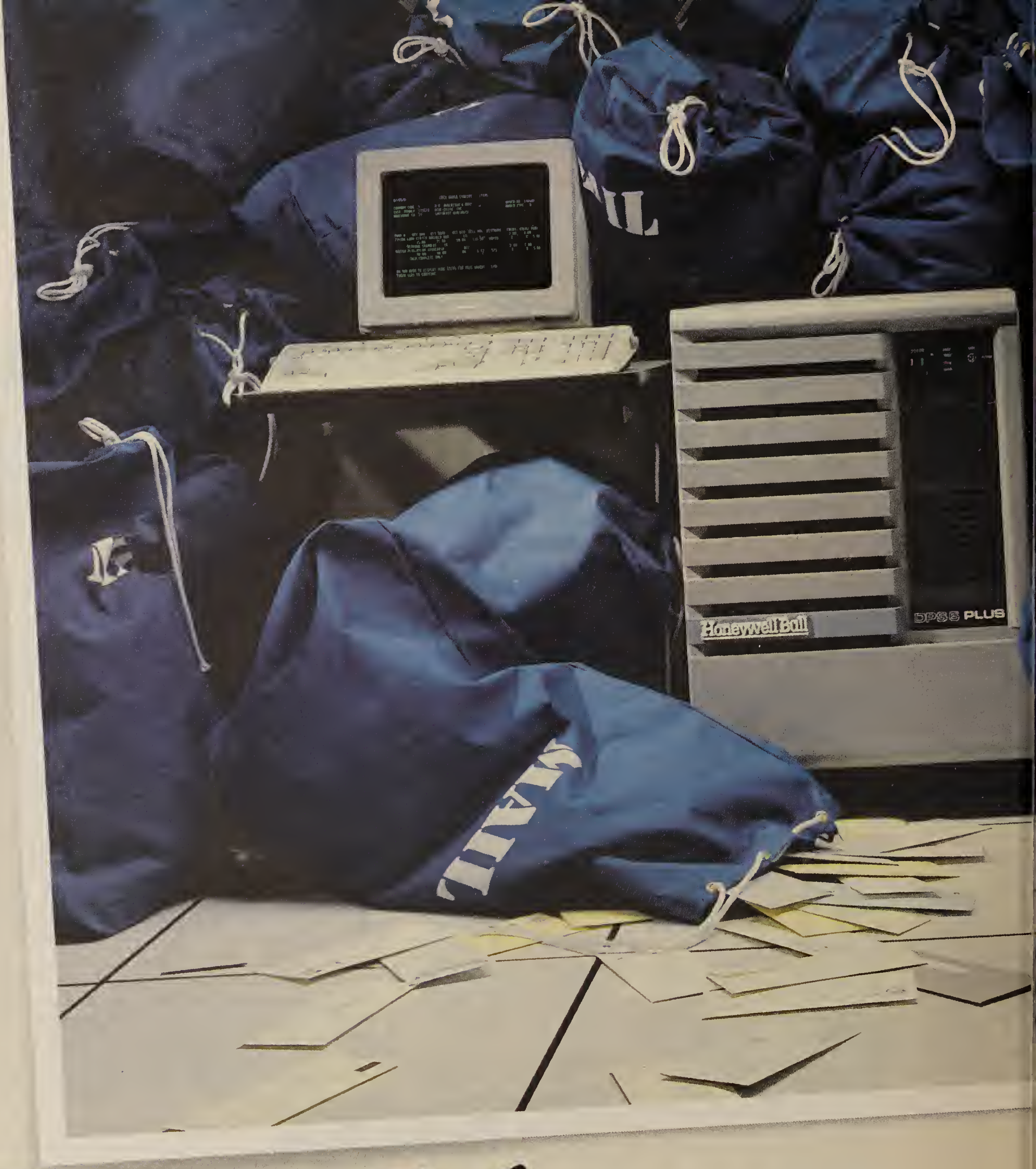
The manner in which IBM provides software to users has evolved over time; distributing software without source code is only one part of that evolution.

More than 25 years ago, when IBM first offered software to work with its machines, the software was provided at no additional charge and without restrictions on its use. The cost of its development and support was recovered in the price of the hardware.

At that time, both source code and object code were routinely made available to customers. The relatively primitive nature of software dictated that source code be provided,

Continued on page 59

- **Half the installed software is OCO**
- **Limited access to DB2, VM/SP and OS/2**
- **IBM 'remains dedicated' to the policy**



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No

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have delivered products that were well received by users.

> IBM customers will be constrained to the interfaces provided by IBM. In the years to come, the IBM user community will be the loser.

Some of the conditions under which software vendors and users require source code are the following:

- No interface exists to satisfy the specific need.
- The interface is too limited in scope.
- The interface will not provide an efficient solution.
- The interface documentation is incomplete, ambiguous or silent on points critical to a particular application.
- There are undocumented interfaces that provide potential functional or performance advantages.
- To understand how an interface operates and its impact on other functions in the program.
- To understand the meaning of the data the interface provides.
- To understand the abnormal termination logic of a program.
- To interpret and understand control block information.
- To support new devices and programming environments.
- To simulate or emulate software and hardware environments.
- To incorporate expert system technology.
- To perform problem resolution when it is unclear which product created the bug.
- To debug programming errors and resolve design questions.

Performance measurement products that monitor IBM operating systems, transaction processing monitors and data base management systems require source code to function effectively. Precompilers often require it as well, depending on the functions they perform. Operating system improvements and new functions have been built because of the availability of source code.

Without access to source code, companies cannot build effective software for session control management, debugging, security, tape management, library management and interactive application development.

Vicious cycle

IBM's policy reduces innovation for some important products. For example, independent companies want to build complementary software for DB2. However, the only interface to DB2 is SQL, which is also the external language for communicating with DB2. Therefore, a new system software product that interfaces to DB2 must look like a user application.

These system software products include language processors (fourth-generation languages), performance measurement tools, retrieval packages and data base design tools. Retrieval packages cannot provide optimum retrieval time because the only way to access DB2 is through SQL. Data base design tools will be limited because DB2 data cannot be dynamically accessed directly, and there is no way to determine through SQL where the data physically resides.

Another example is IBM's VS Cobol II compiler, which is delivered in OCO. An independent software company at one time built a precompiler for IBM's older Cobol compiler using knowledge gained by analyzing the source code. The company found a way to compile only changes to a Cobol program, thus speeding up compilation dramatically. However, this product cannot be built for IBM's new VS Cobol II compiler unless the source code is analyzed and understood.

Yet another example is IBM's Professional Office System (Profs). Third-party vendors are precluded from meeting strongly articulated user requirements for improved security and auditability facilities, interoperability with non-IBM electronic mail systems and enhancement or replacement of the Profs document data base service machine.

Withdrawal symptoms

A final example concerns the use of source code to extend operating system capabilities. Hundreds of innovative products were built to extend the capabilities and improve the efficiency of IBM's VM, MVS and VSE operating systems. This will not be the case for IBM's OS/2 operating system, because source code is not available to independent software companies. Nor will it be the case for new versions of MVS, VM and VSE as IBM withdraws source code for them.

Two instances in particular demonstrate how IBM's withdrawal of VM source code will reduce innovation. First, CMS, the interactive component of VM/SP Release 5, offers a new full-screen mode of operation. While well intentioned, it is hard to use and dramatically slower than non-full-screen operation. Some installations have forbidden its use or prevented its invocation. Since it is OCO, IBM customers cannot remedy the performance problems, enhance the end user interface or add to its functions.

Second, VM/SP Release 6 provides a hierarchical, well-designed Shared File System, a facility demanded by users

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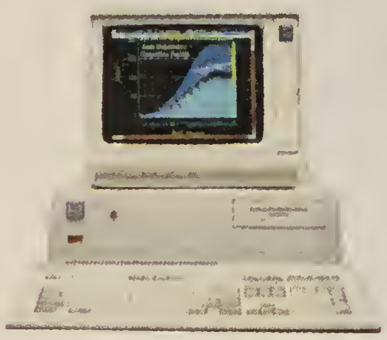
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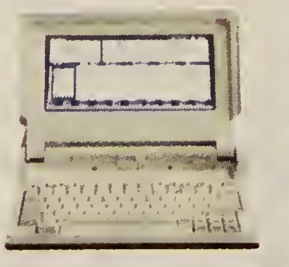
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since 1973. Unfortunately, since it is OCO, it will not support extensions or full utilization. Therefore, vendors as well as IBM customers will be constrained to the interfaces and facilities provided by IBM. In the years to come, the IBM user community will be the loser.

Code retracted

It was in 1983 that IBM reversed its 20-year-old policy of distributing source code with its software product licenses. At that time, the U.S. Department of Justice's antitrust suit was over, and IBM had no government agency looking over its shoulder. True, a case against IBM by the European Economic Community (EEC) was still active, but that was limited to bundling and hardware interface issues.

IBM's source code was fully protected by the copyright laws, so protection was not the real issue. I believe the real issue was access to interface information. IBM has always treated hardware interfaces as proprietary and almost sacred. But access to its hardware interfaces was settled by the 1956 Consent Decree and by the 1984 EEC agreement. Peripheral companies do need hardware interface information to build terminals, disks, tapes, printers, memory and other products that operate with IBM CPUs.

Still, hardware is quite different from software, and the interconnections between two software products are of an almost infinite variety.

Shortly after IBM released its OCO policy, ADAPSO protested in a position paper. Since then, the association has had extensive discussions with IBM, but to no avail. Committees within the Share and Guide users groups have developed similar position papers indicating their need for source code. And when the EEC in 1984 suspended its case against IBM, it specifically stated that IBM's policy on source code was under scrutiny and was not part of the agreement.

Fujitsu Ltd. also recognized the importance of source code for building IBM-compatible systems software and new systems software that is well integrated. Last September, federal arbitrators granted Fujitsu access to IBM source code for more than 750 programs, including the OS, MVS, VSE and VM operating systems [CW, Sept. 21, 1987]. The IBM-Fujitsu arrangement has short- and long-term ramifications for independent software companies and for IBM and Fujitsu users.

Two superpowers?

In the short term, the agreement gives Fujitsu critical information for building systems software compatible with IBM's. And in the long term, it creates a systems software competitor to IBM and to independent software companies. In the future, independents could potentially face Fujitsu, a large and strong competitor. And both IBM and Fujitsu have access to that essential source code.

In the long run, if IBM's OCO policy is not reversed, it could significantly slow the growth of independents. If we look 10 to 20 years ahead, the current international hardware wars between IBM and the Japanese could be replaced by international IBM systems software wars between these two superpowers.

Where will this leave independent software companies if they don't have access to IBM's source code? And where will this leave IBM users if the only vendors for critical software are IBM and Fujitsu? •

Yes

FROM PAGE 55

since the customer bore some of the burden of dealing with any functional or quality deficiencies a given product might have.

As the industry grew, it became more apparent that the development and marketing of software was a desirable business. Software from IBM and other vendors became a separately priced offering. To protect their significant investment in software, firms made it standard practice both to copyright and license software with contracts containing restrictions on its use. Some vendors adopted "trade secret" clauses in their contracts. Many vendors implemented OCO to protect the internal design of their products.

Sapping resources

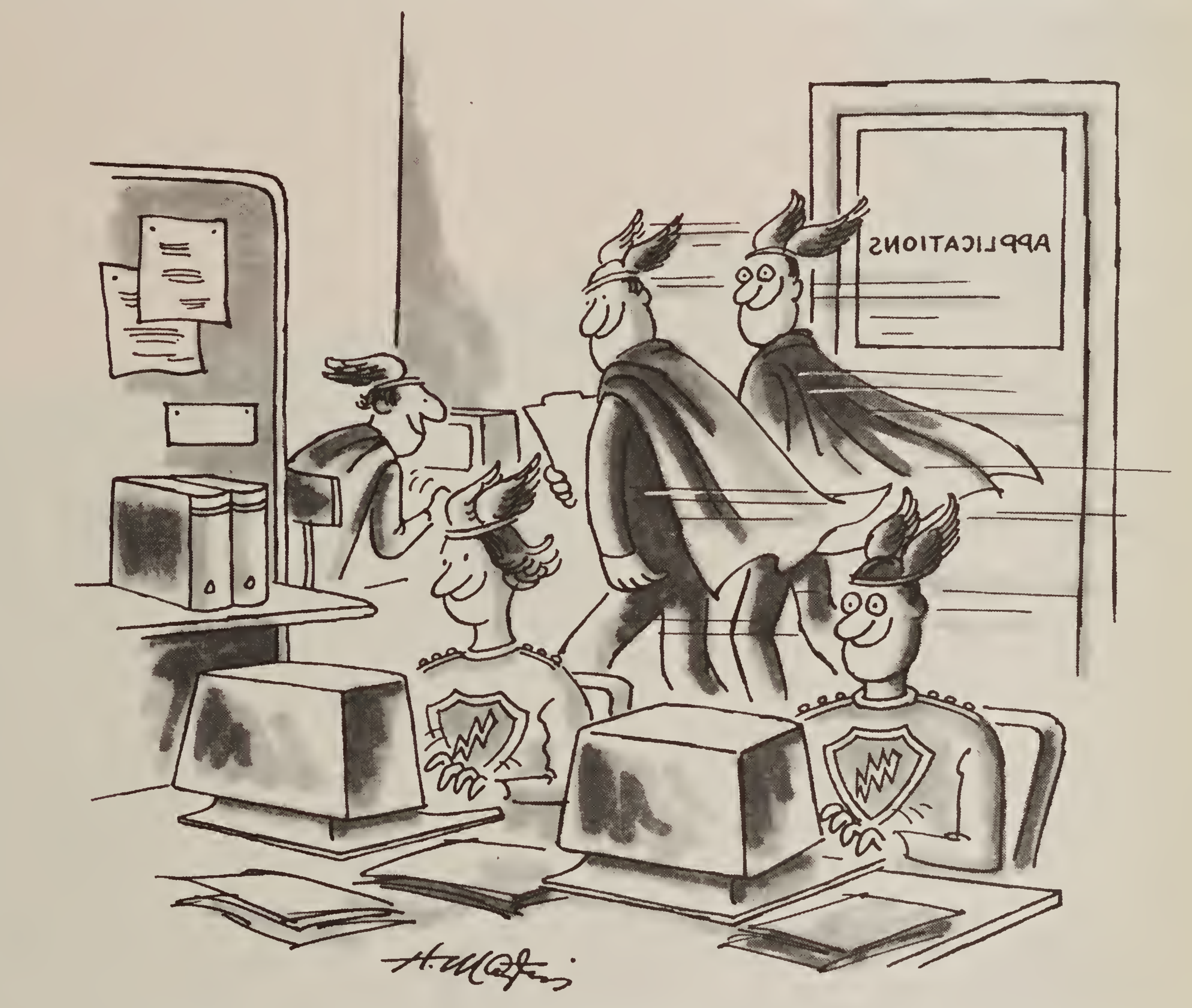
During this time, source code for IBM-licensed programs was available, and customers and third-party vendors developed modifications and enhancements based on the internal design of IBM programs. By the early 1980s, the modifications required customers to devote significant resources to adapting to new versions of the IBM programs. Customers needed to retrofit and retest their code to ensure that it continued to function properly.

As a result, service in this environment was becoming more costly, since these dependencies were frequently a cause of error. Executives at customer sites were concerned about the high level of programmer resources needed to install, enhance and maintain IBM system products.

In addition, the time required by customers or vendors to adapt their modifications caused prolonged software migrations. This delayed the customers' ability to take advantage of new IBM products. Some customers even decided to forgo the benefits of a new version or product.

Pirating

Also at this time, the unauthorized copying of IBM software — including its internal design — was becoming a major problem. As was already the case elsewhere in



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the industry, IBM concluded it had to augment its software protection by adopting an OCO practice.

IBM viewed OCO as an efficient means of addressing these issues, consistent with the objective of building better products. Before proceeding with OCO, IBM discussed its proposed direction with customers and major users groups. Among these groups, there was general support for the company's objectives.

Some users, however, expressed concern that the transition to OCO for existing products — for which source code had been available — would have to be carefully managed to avoid disruptions to existing customer systems.

Before IBM was to move such products to OCO, customers stressed the need for better functional interfaces, improved serviceability and time for customers and third-party vendors to adapt to the enhanced product.

'Typical and reasonable'

With the above considerations in mind, IBM announced on Feb. 8, 1983, that it was moving toward delivering its software products object-code only.

During the transition, if source code is required for some part of a product, it is available to all customers, subject to the limitations of IBM's Agreement for IBM Licensed Programs (ALP). This agreement authorizes typical and reasonable customer uses for source code.

When the announcement was made, IBM understood that the transition would take at least 10 years, with some products never becoming fully OCO. New products such as DB2 are 100% OCO; they did not have to contend with a history of customer and vendor modifications.

The older system products, such as VM, MVS, CICS and IMS, presented a more formidable challenge. Still in an early stage of evolution, they are shipped with nearly all of the source code available.

Managing OCO

As IBM proceeds with the evolution toward OCO, it intends to take full advantage of its experience and growing expertise to accomplish the harder conversions still ahead. IBM believes that there will not be significant problems.

IBM has taken measures to minimize problems with its OCO direction. Before a product ships OCO, the IBM product development manager must demonstrate that the product is serviceable without source code, that appropriate external interfaces and documentation will be provided and that the product will meet customer requirements without source code being available.

These capabilities are tested before the product is announced through customer advisory councils, user group interactions and internal IBM use.

IBM was aware that its own programmers caused the same problems — developing modifications and enhancements based on the internal design of an IBM program.

Consequently, if a product is to ship OCO, IBM does not permit its employees to use the source code for modifying the product. Thus, a test of OCO readiness is applied by the product manager's peers before the product is announced.

> WHEN THE announcement was made, IBM understood that the transition would take at least 10 years, with some products never becoming fully OCO.

When specific customer or vendor problems have occurred, IBM has responded. At times, new or revised external attachment interfaces have been provided and documented. Some customers have engaged in joint development with IBM to produce new functions for the OCO product.

In a few cases, the decision to ship OCO has been at least temporarily reversed, and source code for some or all of the product was made available to any licensed user, subject to the limiting provisions in ALP.

Given the very large number of customer and vendor licensees and given the very large number of active IBM software products, IBM believes it cannot release source code for an OCO program to selected licensees. To do so would be inefficient, difficult to manage and inconsistent with the objectives of OCO.

IBM and ADAPSO

Since OCO was announced, IBM has met frequently with ADAPSO's leaders to discuss the association's concerns about OCO. ADAPSO states several reasons for wanting access to IBM's source code:

- To provide an alternative to inadequate IBM product publications.
- To aid in performing problem identification when both IBM and vendor products are involved.
- To use internal product design information to improve performance.
- To use internal product design information to provide unique vendor functions.
- To exploit internal design information to provide unique business opportunities.

IBM has expressed its willingness to work with ADAPSO or any customer or vendor to correct product or publication deficiencies, including those related to problem identification and performance improvement.

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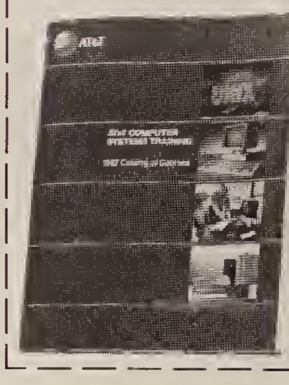

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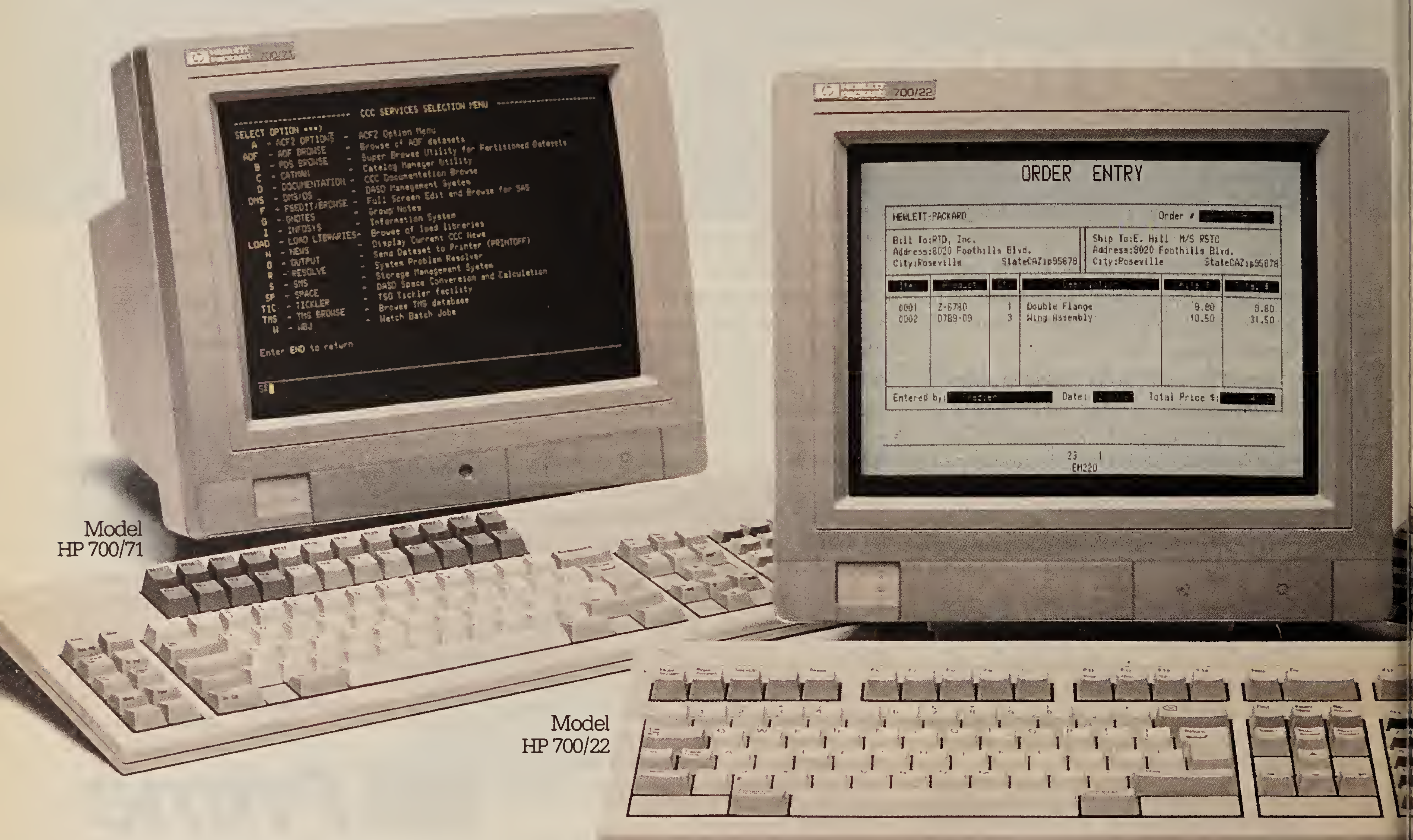

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help software vendors build on IBM's documented attachment interfaces — a highly competitive opportunity.

What IBM is not willing to do is turn over the results of its significant development investment to others to use for whatever purposes they may wish.

Recently, IBM executives met on a regular basis with ADAPSO's leaders to discuss a broad range of topics.

By mutual agreement, the issue of OCO was placed on the back burner to make progress on other issues, such as early access to product external interface information, access to products during Early Support Programs, educational classes on major product changes, hot line support for vendors and so on.

IBM viewed this dialogue as productive and consistent with the firm's recognition that software vendors provide their common customers with valuable products and services. IBM believes it has made, and could continue to make, adjustments in implementing its practices to answer most of ADAPSO's concerns.

The initial press reports of the IBM-Fujitsu Ltd. arbitration — regarding Fujitsu's access to IBM's source code for OCO products — caused ADAPSO's leadership to bring the OCO issue to the forefront again.

ADAPSO's leadership, apparently believing Fujitsu had gained broad, unrestricted access to IBM's source code, could not understand how IBM could continue to deny ADAPSO's members similar "privileges."

Under the terms of the arbitration, IBM is prohibited from discussing the status of any aspect of the arbitration. We are, however, permitted to cite public statements made by the arbitrators: John L. Jones, retired executive vice-president of Norfolk Southern Corp., and Professor Robert Mnookin of Stanford Law School.

Arbitrators speak

Following the initial press reports, both arbitrators amplified on the OCO question. In *The Wall Street Journal* [Oct. 7, 1987], Mnookin said it is "premature for the software makers to fight for similar treatment to that accorded to Fujitsu because the financial terms and many other details of the resolution are still up in the air."

According to *Computerworld* [Nov. 2, 1987], Jones said, "The instructions will carefully spell out what [Fujitsu] can derive from [the source code], and it will be largely interface type of information. It won't be detailed programs or detailed design logic flowing out of the secured facility. . . . They can look to verify what the communications interfaces are between that program and other programs."

Furthermore, in an American Arbitration Association press release [Sept. 15, 1987], Mnookin remarked that access to IBM source code "will occur only in a secured facility whose personnel will have no direct or even indirect contact" with those people who are actually developing software.

WHAT IBM is not willing to do is turn over the results of its significant development investment to others.

Misunderstanding

It appears to IBM that ADAPSO's leadership misread the situation and overreacted. By choosing the path of public confrontation, ADAPSO's leadership is saying it no longer wishes to discuss these issues with IBM or to resolve specific problems that may occur.

Since these issues remain of great interest to IBM, the company will continue to hold discussions with individual software vendors — discussions that will, of necessity, accommodate a smaller audience.

IBM remains committed to its OCO objective, committed to working with those interested in achieving the product improvements necessary for successful OCO implementation and committed to resolving specific problems as they occur. •

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Using advanced robotics and Artificial Intelligence (AI) technologies, a U.S. Army scout car was computer-driven from a remotely located command post over a mile away. During the first-of-its-kind demonstration, the Advanced Ground Vehicle Technology program, sponsored by the Defense Advanced Research Projects Agency and the U.S. Army's Tank-Automotive Command, utilized three Hughes-built systems. The Autonomous Vision System transmitted video images of the road to computers which sent back steering, brake, and throttle commands. The AI-based Map And Planning System kept track of the vehicle at all times and displayed its location and a map of the local area on a color monitor. The system was operated day and night with Hughes thermal sensors and a complex communication link which coordinated the overall system function.

Airborne radar systems for the 1990s and beyond will benefit from a new, frequency agile microwave reference unit under development at Hughes. The reference unit will enhance the ability of new airborne radar systems to provide ship imaging, long-range high-resolution ground mapping, and reduced mutual interference. The unit will provide the radar receiver and transmit signal generator with 96 channels across a 1 gigahertz bandwidth and will be able to switch channels in 30 microseconds. Older reference units provide 32 channels and require 5000 microseconds to switch channels. The new reference unit has a volume of 120 cubic inches, nearly 50 percent smaller than older devices.

The feasibility and benefits of adapting the Free Electron Laser (FEL) to perform precision radar measurements in space will be examined under a new Hughes program. Scientists will study the potential of the FEL as a compact space-radar transmitter that would be part of a Strategic Defense Initiative (SDI) system for discriminating objects in space. The program will take advantage of the FEL's inherent tunability, high power and efficiency, and its ability to operate in frequency bands of 100 GHz and higher. The program's ultimate goal is a space-based, multiband, adaptive FEL capable of operating efficiently at randomly chosen, stable frequencies.

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Ron Skelton

Projects take teamwork

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The tool, Project/2 from Project Software & Development, handles tasks from shop floor planning to the 10-year strategic plan and has been used for the past three years to forecast sales up to a year in advance. I've been asked how we implemented it, and I'll attempt to answer that question by describing our team approach.

Although it's possible for a team to succeed in spite of its leader, the leader makes or breaks the team in most cases.

The leadership approach we find most successful is often described as "people-oriented." That doesn't mean a friendly, easygoing, softhearted person who sets easy goals. To the contrary, as described by author Tom Peters, the people-oriented leader sets difficult goals and high standards and demands excellence at all times, both in himself and the people who work for him. These leaders see people as the prime medium through which everything is accomplished. They have a tremendous respect for the potential of every individual.

There are several things the leader must do for the team. They include providing and conveying a vision, ensuring that team and individual accomplishments are recognized, clearing

Continued on page 72

Market collapse could restrain MIS spending

BY DAVID A. LUDLUM
CW STAFF

Driven by forces that transcend short-term financial concerns, companies generally planned last year to boost information systems spending this year, and the stock market collapse has not changed their budgets significantly, according to a study.

But companies reported that the market crash could lead to closer scrutiny of systems spending as the year goes on.

Companies in all but one of 15 industry groups surveyed by Mountain View, Calif.-based Input said they plan to boost MIS spending this year, according to the research firm's Annual Information Systems Planning Report, which is based on data collected through 1987 and was released last month.

Continued scrutiny

A follow-up check in November indicated that October's stock market collapse generally did not prompt budget revisions but that it will lead many companies to scrutinize spending more closely as expenses arise, according to Douglas Tayler, manager of Input's information systems program.

Input surveyed about 200 large companies and found that on the average, all industry groups except utilities planned to raise information systems budgets this year. The increases were led by firms in telecommunications, at 12%, transportation, at 10.3%, and insurance, at 9.6%.

Companies in discrete and process manufacturing planned boosts of 7.6% and 7.2%, respectively, and those in financial services, including banks, planned an increase of 2.6%. Retailers projected no change; utilities forecast a drop of 0.2%.

Rather than near-term business concerns, the study found systems spending driven by several trends, Tayler said. They include rising expectations of senior management, new technologies and increasingly complex applications, such as links between corporations.

Two other forces cited, which are more likely to restrain spending, are companies' sensitivity to costs and the instability prompted by mergers and re-

Continued on page 72

Data View

Fostering frustration

Among 609 Computerworld *readers surveyed, 81% said they are frustrated with aspects of their jobs*

Top five sources of frustration cited	*Percent of respondents*
Ineffective or poor management	32.5%
Lack of advancement or career growth	11.4%
Not enough staff or heavy work load	8.7%
Lack of resources or poor or obsolete equipment	6%
Lack of communication with management	5.6%

CW CHART

Driven by enthusiasm

Fidelity systems chief likes an open throttle

PROFILE

Michael Simmons

JOHN OWENS

Position: *President, Fidelity Information Services Co.*

Mission: *Maintaining systems flexibility, attracting self-motivated technical experts, keeping turnover low, developing new technologies.*

BY DAVID A. LUDLUM
CW STAFF

BOSTON — It's not easy to pick out the subject Michael Simmons seems most enthusiastic about, but it just might be the programs his company has put in place to develop its personnel.

Simmons, president of Fidelity Information Services Co., the data processing arm of mutual fund giant Fidelity Investments, Inc., takes obvious pride in displaying awards for Fidelity's recruiting programs and in describing a procedure for confidentially routing complaints directly to him.

In fact, Simmons, whose organization has produced an automated system for customers to get mutual fund prices and portfolio values via Touch-Tone phones, constantly speaks of the importance of people in data processing — and not just through platitudes.

He volunteers an opinionated view of the propensity of DP professionals to hop from job to job for a promotion or, he says, just because the going gets tough. "They're prostitutes," Simmons says of the more flagrant job-hoppers. "They don't have to live with the results that they propagate on someone."

Many interests

But Simmons, talkative and seemingly self-assured, warms to plenty of other subjects, too. While he says he typically puts in 60 hours a week on the job, not all of them have to do with work. There's cooking, for instance, in the 18- by 33-foot kitchen in the California-style contemporary home he has built in the Blue Hills just south of Boston or woodworking with his new lathe.

His interests also include anything on wheels. He owns a 750cc, six-speed Honda V45 Sabre motorcycle and a four-wheel drive Chevrolet pickup truck, and he's replacing his Porsche 944 with a 911 Cabriolet.

He also builds cars that he races on the Sports Car Club of America circuit. He finished fourth in his class in the national championship in 1980, and, with his seventh car under construction, he's still chasing first place. He fields questions on mechanical matters from staff members and occasionally tinkers with their engines. He gets two weekly auto magazines and seven monthly ones. "I'm what is known as a car nut," he says.

Simmons, who is 48 and divorced after an eight-year marriage, acknowledges that he is "not the type that likes to be passively entertained," with the exception of an occasional basketball or football game.

Continued on page 68

MANAGERS ON THE MOVE

Former MIS boss crafts new transaction services

David Weber will be aiming to apply banking technology to other services as the recently appointed vice-president of the Information Services Group at **Transfirst Corp.**, a Dallas-based on-line transaction processing company.

Weber, once director of MIS for Giant Stores and a Touche Ross & Co. consultant, is responsible for all data processing at Transfirst, which is exploring the use of credit card verification technology to identify patients for health care providers and the use of automated teller machines to dispense food stamps and other government benefits. It already distributes airline and pro basketball tickets through ATMs.

Weber has studied the development of new services based on information technology, including automated payment of bills, as a vice-president at Payment Systems, Inc., a Tampa, Fla., electronic funds transfer company. "It keeps you thinking. It's an additional challenge that I sort of enjoy," he said. "It's looking at the value of the transaction itself rather than the money you're moving."

William E. Eager has joined **First National Bank of Ohio** in Akron as senior vice-president of operations and information systems. Eager joined the bank from Diversitech General, where he was director of information systems. Previously, he was manager of information systems at Limbach, Inc., a senior consultant with Touche Ross & Co. and a systems supervisor at General Electric Corp.

Neena M. Gupta has joined **Cross & Brown Co.** as director of data processing, with responsibility for the New York real estate firm's computer operations.

Previously, she was systems coordinator at Watt Industries, Inc. She has also been a systems engineer for IBM.

Karin Steinbrenner has been appointed director of computer services at **Framingham State College** in Massachusetts, where she will implement integrated computing facilities for students, faculty and administrators and create an institutionwide data base. Previously, she was manager of information systems at Mid-State Technical Institute in Wisconsin and director of data processing at the National Opinion Research Center.

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Cleveland	3/1
Colorado Springs	1/26
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Dallas	3/3
Denver	1/28
Detroit	1/28, 2/25
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Driven

FROM PAGE 67

His fascination with cars isn't surprising, given his background. Simmons built hot rods as a teenager in southern Indiana and went to work as an auto mechanic right out of high school. He got into DP as a "card walloper" and then as an IBM 650 operator at Cummins Engine Co. Next, he worked as a tab analyst at Arvin Industries, Inc., a muffler maker. After a layoff there prompted by a steel strike, he hitchhiked around the country, working at odd jobs like lumberjacking and, at one point, joined the merchant marine.

He had graduated in the lower 10% of his high school class but enrolled at Indiana State University. There, he excelled academically, served as class president and, he says, matured.

Simmons taught high school biology, "got drafted" into teaching vocational DP and then worked for IBM as a systems engineer, marketing representative and education manager. That experience led him to a job as executive vice-president for operations at American Fletcher National Bank, which is now a unit of Banc One, and then to Fidelity, which he joined in his current post.

JOHN OWENS

Car nut Simmons *with a different sort of machine.*

Loose technical reins

Despite his early immersion in the nuts and bolts of data processing, Simmons expounds on the view of DP as a business function. "I'm not the lead technician. I don't try to be the most technically competent," he stresses. Instead, he says, he seeks to surround himself with young, aggressive experts.

Richard Johnson, an executive vice-president with Fidelity Information Services, says Simmons brings together technical savvy and business acumen. "He remains astonishingly technically current while doing an amazing job of managing people. Usually [in others], one or the other is present, but not both," Johnson says. Simmons also has a remarkable memory and an "almost visionary" sense of the future, Johnson adds.

Richard Daubenspeck, a Fidelity Information Services senior vice-president, credits Simmons with exceptional skills in building an organization and setting its direction.

Fidelity realigned

Despite his business orientation, Simmons seems somewhat wary of the reorganization of Fidelity's applications development that took effect Jan. 1. It calls for the dispersal of much of the development from Simmons' central organization to about 10 business units or groups. Reflecting the realignment, the name of the central organization has been changed from Fidelity Systems Co. to Fidelity Information Services Co.

The change, which formalizes a process that has been under way for the past year, was prompted by Fidelity Investments Chairman Edward C. Johnson III and is aimed at bringing applications developers and business managers closer together, Simmons says. "We're trying to move the applications developers closer to the business units, so they get more sensitized to the business needs of the various units and [so that] the units get data processing expertise," he adds.

Some 300 to 400 development people will be redeployed to the business units, although not all of them will physically move, Simmons says.

Characterizing the move as experimental, he says Fidelity will know whether it is working by the end of the year. "The important consideration is standardization — getting everybody to play by the same rules, solving corporate needs and unit needs without conflicts," he says.

While Simmons still oversees a budget of more than $100 million, he says he'd rather be accessible than respected for a title. He backs the contention with a self-effacing manner, referring to himself as "a dumb country boy."

If any one thing has driven Simmons from country boy to information systems leader, it appears to be a pervasive enthusiasm. "I get up with the same degree of enthusiasm whether I'm going to work or going to the beach," he says.

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Dexpo East 88, The 14th DEC-Compatible Exposition & Conference. New York, Feb. 16-18 — Contact: Susan Werlinich, Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Resocom '88. Paris, Feb. 16-19 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Auto Ideas. Atlanta, Feb. 17-18. Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

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Supercomputing Europe '89. Utrecht, The Netherlands, Feb. 21-23 — Contact: Royal Netherlands Industries Fair, Postbus 8500-3503 RM Utrecht, The Netherlands.

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The Fifth Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 22-24 — Contact: Quality Assuerance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics New York. New York. Feb. 22-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance for Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121

Super Graphic Workstations. Monterey, Calif., Feb. 23-25 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

1988 ACM Computer Science Conference. Atlanta, Feb. 23-26 — Contact: Association for Computing Machinery, Conference Dept., 11 West 42nd St., New York, N.Y. 10036.

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Skelton

CONTINUED FROM PAGE 67

away bureaucratic hurdles and other obstacles, providing the best tools and equipment and establishing well-defined short-term goals.

Although I'm an engineer, it's our experience that the best team members have been political science and business majors with some experience in computer applications. They tend to know how to deal with change and shades of gray.

It takes time to build a strong team. A high turnover rate will kill you. For these reasons, we chose people with roots in the local community — graduates from the local college.

In addition to our ongoing companywide reorganizations, we have a constantly changing product and customer mix. We therefore wanted an organizational structure that was flexible enough to react quickly to the changing environment but that still preserved the emphasis on teams. For this reason, we chose a matrix organization.

For years, I had sworn I would never use a matrix organization. It's too difficult to manage, with too many chiefs and not enough Indians. But with some modification, it seems ideally suited to the team emphasis. The key to the matrix organization is having functional managers who are not possessive and who understand their roles.

The matrix organization lets us reorganize frequently, within limits. It also allows changing personnel assignments in a very nonthreatening manner. Finally, by participating in several teams, individuals' contributions are emphasized, and their identities are strengthened.

What else made the project work?

One factor was understanding the mission. Like most businesses, our goal is to make money, and we make no money installing computers or implementing software packages. We make money selling rocket motors. To us, time really is money.

The next factor is pure heresy coming from a planning department: Resist developing a detailed long-range implementation plan. Implementation plans are probably the biggest cause of failure in implementing software applications. They don't just set a minimum level of performance, they also tend to set a maximum level. Once presented to upper management, they become cast in stone and, despite promises to the contrary, become very difficult to change.

At completion, an 18-month implementation plan will leave you with a product that has been obsolete for 15 months. I assure you that three years ago, there was absolutely no way to foresee where we wanted to be today.

A much better approach is a broad statement of the direction this implementation is headed in and a clear definition of some short-term products. Nothing generates grass roots and management support like useful products. An evolving implementation that follows a path strewn with them will also show a good return on investment — another point that will sit well with management. In conjunction with this, the team must be prepared to abandon products for which there is no user or whose cost exceeds their usefulness.

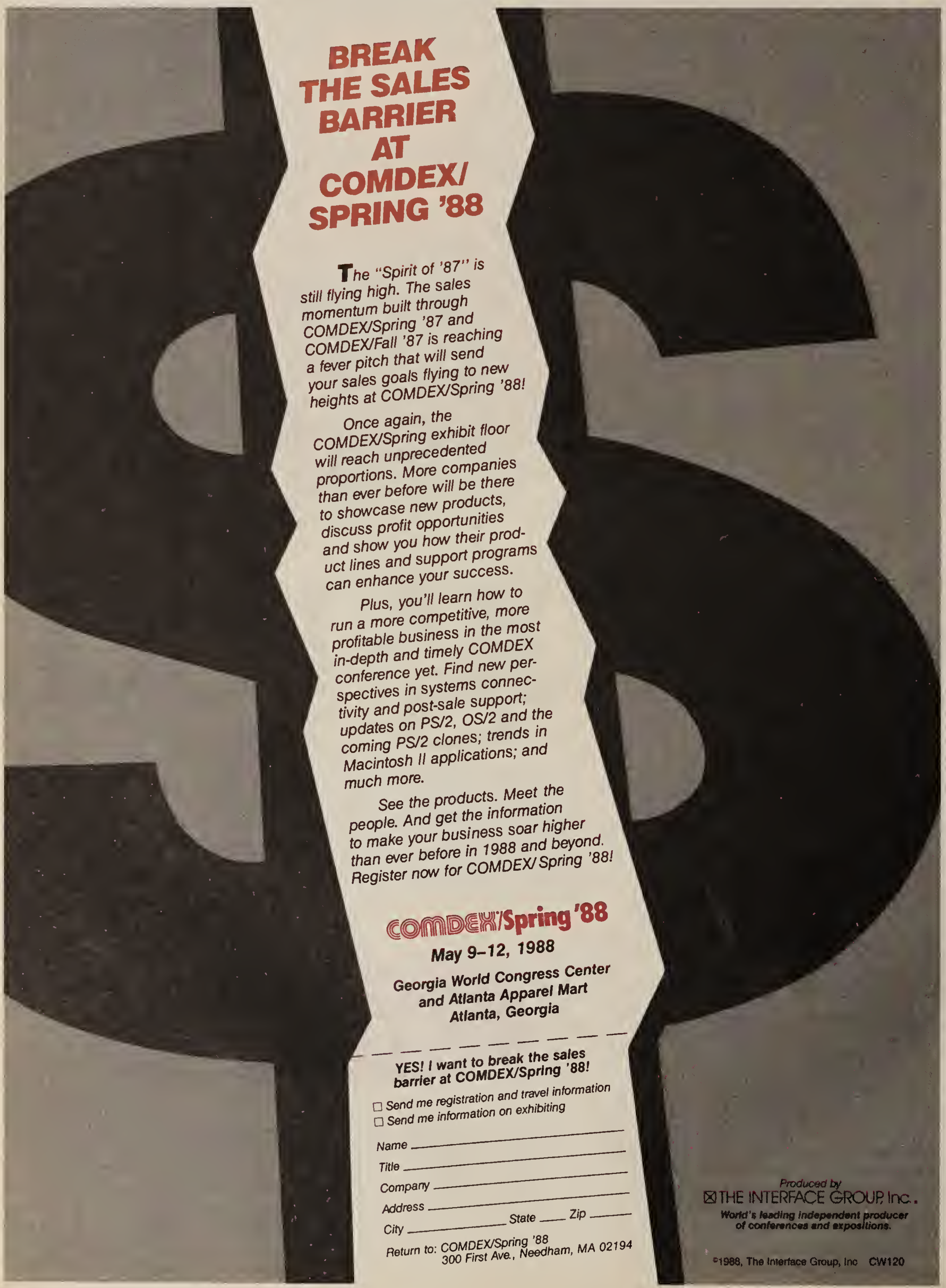
Another bit of advice is train, train, train. We train for the development of broad-based skills. We want people to understand not only every aspect of their job but also the jobs of every other member of the team. This increases our flexibility in personnel assignments and has resulted in some surprising innovations.

We encourage innovation at all levels. We have people who come in on their own time to "play" or take terminals home so they are not distracted by the day-to-day demands of the job. People are encouraged to try things, to do something, to "fail forward," to make products and then modify and improve them, rather than to wait until every aspect of a product is perfect.

Finally, the authority for the team to do its job is delegated to it. I do not try to tell the members how to accomplish their tasks — only what the tasks are.

The last thing I would suggest is to avoid the ivory tower approach. By this, I mean putting the implementation in the hands of either the computer center or someone who reports to the president. Both these approaches lead to the implementation plan becoming the mission.

Skelton is manager of master planning and materials management at Aerojet Solid Propulsion Co. in Sacramento, Calif.



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Spending

CONTINUED FROM PAGE 67

structuring, Tayler said.

He also noted that the specifics of budget plans vary greatly among industries. "Each industry and its current state of evolution can vary quite a bit. There is that much uniqueness in today's market."

Hardware accounted for much of the large projected budget increase in telecommunications, while personnel expenses did so in insurance, one of the few industries that reported plans to increase staffing, Tayler said.

In about half of the industries, microcomputer budgets are growing faster than mainframe budgets, although they remain smaller, Tayler reported. Insurance firms planned budget increases of 2% overall for hardware but of 15% for micros, bringing the portion to about one-third that of mainframe budgets.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

If at first you don't succeed

1986: The year optical disk technology will be accepted by the MIS masses.

Whoops. Let's try that again. 1987: The year optical disk technology will be accepted by the MIS masses.

Hmmm. Guess not. Well, let's say it once more, this time with feeling. 1988: The year optical disk technology will be accepted by the MIS masses.

The anticipated embrace of optical disk storage systems by corporate America has been as difficult to predict as a Sandinista cease-fire. Yet industry optimists continue to gaze into their crystal balls and come away saying, "Now is the time." But it's anyone's guess when — or if — optical storage will become an MIS mainstay.

CAP International, a research firm in Marshfield, Mass., estimates that the optical disk industry will grow from $282 million in revenue in 1988 to $1.4 billion in 1992. There were roughly 170 optical systems in place with end users in the U.S. at the end of last year, a figure that should jump to 4,630 by 1992, CAP predicts.

At a snail's pace

Belying industry projections, however, the promising technology and the industry spawned to create it have continued to move sluggishly into data processing centers and onto desk tops. The following are a few of the variety of reasons for this:

- The lack of standards in optical disk technology has been a major thorn in the industry's paw. If there are no set standards, how can one ensure that the system purchased in 1988 will be viable in 1990? It's like the old Betamax vs. VHS videocassette recorder argument of the early '80s: Which format do you buy?

An International Standards Organization meeting on the matter is scheduled for October. But most observers say that's only the beginning, and it is not expected to create any immediate solutions.

Continued on page 76

Good year for wheeling, dealing

Index shows mergers and acquisitions totaled $4.9 billion in '87

BY NELL MARGOLIS
CW STAFF

FORT LEE, N.J. — If you don't think the software and services industry is the place to be, just ask the 358 companies that shelled out a cumulative $4.9 billion last year to get into it — or, in some cases, to get further into it.

According to the recently released ADAPSO/Broadview Associates Index — a data base of software and services company mergers and acquisitions compiled for the industry association by investment banker Broadview Associates — 1987 was a record-breaking year for combinations of software and services providers.

Between the Denver Broncos' back-to-back Super Bowl losses, the industry saw an all-time high dollar amount — $4.9 billion, up 29% from the 1986 total — change hands in 358 transactions, up from 305 the previous year.

More than twice the number of "megadeals," or those topping the $100 million mark, were made in 1987 as in 1986, Broadview partner Gilbert Mintz said.

Computer Associates International, Inc., the once and future king of the category, broke its own record for the largest sum ever paid for a software company when it acquired software giant Uccel Corp. for $830 million last summer.

Big players joining teams

"What we're seeing is clearly concentration, not consolidation," Broadview partner Charles Federman said. "Concentration is what you get when the largest players in an industry are growing faster than the industry in general. Consolidation is what you get when an industry is shrinking."

Fallout from Wall Street and Washington, D.C., was minimal, Mintz said. "The crash killed some deals that were going through the hopper in October," he commented, "but not enough to make any real statistical difference."

The Tax Reform Act of 1986 (TRA) was a mixed bag, according to Mintz. Dropping the maximum corporate tax rate from 46% to 34%, he said, "made a number of software and services companies more valuable overnight. There's been a 15% to 20% increase in the value of software and services companies pretty much across the board, courtesy of TRA '86."

This inflation, in turn, drove deal prices up in 1987, killing some transactions and fattening others, Mintz added. Also cutting both ways were tax act provisions that "made it difficult to do asset transactions rather than stock deals," he said.

Overall, however, taxes had relatively little impact on whether and why software and services companies consummated deals last year.

This situation stands in stark contrast with 1986, according to Mintz, when the rush to close corporate buys before the capital gains provisions expired at year's end fueled a late autumn industrywide shopping spree that drove merger and acquisition statistics into the stratosphere.

Better than healthy

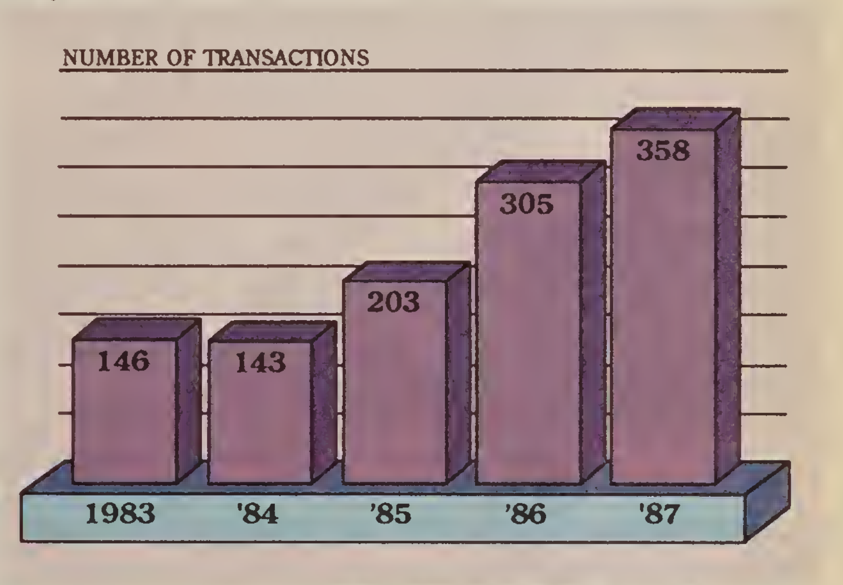
"What all this adds up to is a healthy software industry that's getting even healthier," Mintz said.

Figures compiled by Mountain View, Calif.-based market

Continued on page 76

Another bumper crop

Number of software and services industry acquisitions in the past five years



INFORMATION PROVIDED BY BROADVIEW ASSOCIATES

Cullinet wipes the slate clean

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. announced third-quarter 1988 balance sheet adjustments last week that will result in a before-tax income drop of approximately $13.7 million.

According to Cullinet Chief Financial Officer Donald W. Lohin, the company is writing down the value of project management software acquired last year from Newport Beach, Calif.-based Planning Control International, Inc. (PCI), as well as that of certain notes and receivables.

These receivables include an uncollectible amount owed by a now bankrupt corporate customer and receivables from Cullinet's Latin American operations.

Cullinet's devaluation of the PCI software — a Digital Equipment Corp. VAX-based project management system originally acquired by Cullinet with large defense contractor customers in mind, a company spokesman said — should "in no way signal a departure from any of our stated directions," Lohin added.

Disappointment over the product's performance, he said, left Cullinet with the alternatives of either rewriting or writing off the software; the company chose the latter as the most cost-productive option.

Not just for mainframes

"These write-offs clear the deck for Cullinet," said Charlotte Walker of L. F. Rothschild & Co. With this announcement, she said, "the company is making a clear statement: Out with the old, in with the new. We're not just a mainframe software company anymore."

Walker called both the accounting changes themselves and Cullinet's announcement of them "a courageous move. And well timed. It's no fun that they're having the write-off — it never is — but this points out that the [new executive team as-

Continued on page 74

Midas touch, 386 propel Compaq to $1 billion mark

BY JAMES DALY
CW STAFF

HOUSTON — Compaq Computer Corp. rode its industry domination in the sale of Intel Corp. 80386-based personal computers to become the first U.S. corporation to surpass $1 billion in annual revenue in less than five years, the company reported last week.

The microcomputer manufacturer also reported healthy gains in both revenue and net income for its fourth quarter ended Dec. 31, 1987.

Quarterly revenue came in at $432.1 million, up 131% from $186.9 million recorded for the same period in 1986. Net income grew 202% to $49 million, up from $16.2 million reported a year earlier.

Compaq joined a rarified corps of billion-dollar microcomputer companies like Apple Computer, Inc. and IBM in announcing yearly revenue of $1.22 billion, up 95% from $625.2 million in 1986. Net income grew 218% to $136.3 million, or $3.57 per share, from $42.9 million, or $1.33 per share, the previous year.

Although the results were in line with analysts' expectations, Compaq's financial expansion buttressed the notion that it is beating back the IBM Personal System/2 Model 80 as its main competition in the high-speed 386-based PC field.

"The IBM 386s have been in the channel for six months and they still haven't had much of an impact with users," said Bruce Lupatkin, a senior technology analyst with Hambrecht & Quist, Inc. "In fact, there is a glut of Model 80s out there. But I expect IBM to take additional pricing action to offset this [development]. Compaq may begin to feel some effect, however, when IBM ships the Presentation Manager and OS/2 Extend-

Continued on page 74

WASHINGTON INDUSTRY NOTEBOOK

CBEMA presents '87 public policy awards to legislators

The **Computer and Business Equipment Manufacturers Association**, or CBEMA, recently presented its 1987 public policy awards to U.S. Sens. Max Baucus (D-Mont.), Dennis DeConcini (D-Ariz.) and Bob Packwood (R-Ore.); U.S. Rep. Robert T. Matsui (D-Calif.); and Michael Keplinger, an attorney with the U.S. Patent and Trademark Office.

The awards were granted for supporting the information technology industry in the policy areas of trade, taxes and intellectual property protection.

Harris Corp. recently formed a subsidiary to focus on software development and support for the federal government and its prime contractors.

Harris Data Services Corp., which is based in Alexandria, Va., reportedly will specialize in Ada software, data base management systems and multilevel security as well as simulation.

Paul R. Patch, vice-president of software operations at Harris's Government Information Systems Division, has been appointed to head the subsidiary.

The **U.S. Department of Transportation** last month announced a final rule that is expected to make it easier for the telecommunications industry to lay fiber-optic cable in right-of-way sections on interstate highways.

The rule permits states to decide whether cables can be installed along highways.

In the past, the federal government has been reluctant to grant permission; since 1960, it has granted only 250 requests, most of which were for very short segments of highway.

British Telecommunications PLC recently announced it will consolidate its electronic messaging services, including Rockville, Md.-based Dialcom, Inc., into a single Dialcom Group.

The combined group will consist of Dialcom; Telecom Gold, a UK public messaging service; British Telecommunications' value-added business services, including the Prestel videotex service; and the computer network services division in the UK.

John Morris, president of Dialcom in Rockville, has been appointed chairman of the new international business group, which is expected to reap an annual revenue of $100 million.

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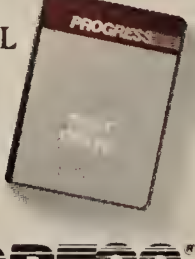

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Cullinet

CONTINUED FROM PAGE 73

sembled by Chairman David L. Chapman] has taken a fine-tooth comb to the company in every respect. Now they're saying, 'Here's a clean balance sheet; there's no funny money in here.' "

Stressing that the write-downs constitute "a nonrecurring charge to operations," Lohin said, "this was the best time to do it. This [third quarter] will be our last quarter of showing a deficit. We don't want to jeopardize fourth-quarter profitability."

In a prepared statement, Chapman said, "Our objective remains to return Cullinet to profitability in the fourth quarter of fiscal 1988."

The third-quarter write-offs, Lohin said, will result in an approximate thousand-dollar dip in the firm's break-even point for the next 13 quarters or so, marginally hedging Cullinet's bet on imminent profitability. But analysts saw the move primarily as housecleaning on the eve of a sizable product rollout. "They're just trying to clean up their balance sheet," said Paine Webber, Inc. analyst Robert Therrien. "I don't think there's anything to read between the lines."

Compaq

CONTINUED FROM PAGE 73

ed. Then customers will be able to benchmark the PS/2 as it was intended to be benchmarked. It's hard to evaluate a product when you don't have software to run it."

Mike Swavely, Compaq's vice-president of sales and marketing, said the 32-bit Compaq Deskpro 386 held an 80% share of 386-based PC sales in dealer channels in 1987. He added that the number of units sold by the firm was trimmed by the shortage of 386 chips that hit the industry last year.

"The shortage certainly affected sales of our 386 models, but by how much is anyone's guess," Swavely said. "But I do know that when the shortage decreased, there was still a shortage of our product, while some of our competitors' models sat on the shelves."

Although it may be difficult for Compaq to notch similar gains for 1988, Swavely predicted a 20% growth in the firm's PC business this year, fueled by the continued success of its recently introduced Portable III and a strong push into the evolving international market.

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— Larry Harman
President
BridgeWorks Software, Inc.

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February 2, 1987 Volume XXI No. 5 $44/Year

COMPUTERWORLD

IBM revs up 3090s — with a hitch

Rolls out biggest mainframe ever

INSIDE

In Depth: Price Waterhouse expects more from microcomputers. 53

Lack of advance notice riles users

BY JEAN S. BOZMAN

relationships with IBM. Some of these firms were among the earliest to install the IBM 3090 Models 200 and 400. They learned that their machines would have to be upgraded to higher E models in order to gain

BY STANLEY GIBSON

RYE BROOK, N.Y. — IBM last week replaced its 3090 mainframes with a new line of machines, including

cessing units, and the Model 300E has three CPUs. Both computers will be available in the third quarter of this year.

Martin

CONTINUED FROM PAGE 73

- Erasable optical technology's crawl toward the marketplace has been slow. The 12-in. write-once read-many optical format is expected to be the dominant system for the next year or two. Not being able to erase what is stored on an expensive optical platter is perfect for applications such as legal and medical archiving, but it is too limiting in others. Some analysts predict erasable optical disks will not be a practical medium until late 1989.
- Optical technology needs to exhibit better price/performance. Optical systems are expensive, and because they don't really replace any existing technology, such as magnetic hard disks and cartridge tape, MIS budgets are forced to stretch even further to accommodate them. Optical disk access times are also significantly slower than magnetic's, and although optical's storage capacity can stretch up into the gigabytes, several manufacturers, including IBM, are working on greatly expanding magnetic disk storage capacities.
- Many MIS shops treat optical storage technology with the same apprehension they initially gave personal computers. Most end users are department managers without extensive technological experience that concerns MIS. Also, as with the early PCs, integration between optical and mainframe systems can be raw and often nonexistent.

Industry pundits tell us that only 10% of a typical U.S. company is automated; the remaining 90% is still dependent on traditional tools like pen and paper.

Optical companies see this as an unlimited opportunity. They pour money into research and development, release dazzling products and end up scratching their heads because their products aren't selling like miniskirts in a New York department store.

The truth is, corporate America is not as computer-sophisticated as we like to think. Optical vendors may be trying to force a bold new technology on the market at a time when many potential users are still getting used to PCs, facsimile machines and modems. Companies must have great faith to convert all their paper files — essentially histories — to an optical platter for safekeeping.

There is no doubt that optical disk storage and image processing are wonderful, worthwhile, time-saving technologies that could revolutionize the way we do business. But for most companies, after struggling with complex questions about how to connect a micro to a mainframe and when to downsize from a mainframe to a mini, optical technology is still too much, too soon. Maybe next year.

INDUSTRY pundits tell us that only 10% of a typical U.S. company is automated; the remaining 90% is still dependent on traditional tools like pen and paper.

Martin is a *Computerworld* West Coast correspondent.

Dealing

CONTINUED FROM PAGE 73

research firm Input show the software and services industry growing at an average annual rate of 17% during the next several years to reach $145 billion by 1991.

Merger trends in 1987 largely continued along previously established lines, according to Broadview Associates.

Choice picks included microcomputer software companies, firms that offer complex systems integration services to both government and commercial organizations and software — as opposed to service — companies, with software products accounting for 55% of total transactions.

Within the services sector, the number of professional services transactions rose 7%, while that of processing services deals took an 8% fall.

Escalating globalization, spurred by the high return-on-equity opportunities offered by U.S. software companies, ranked high on all trends and forecast lists at Broadview. "If this keeps up, we might have to change our name to Abroadview," Mintz quipped.

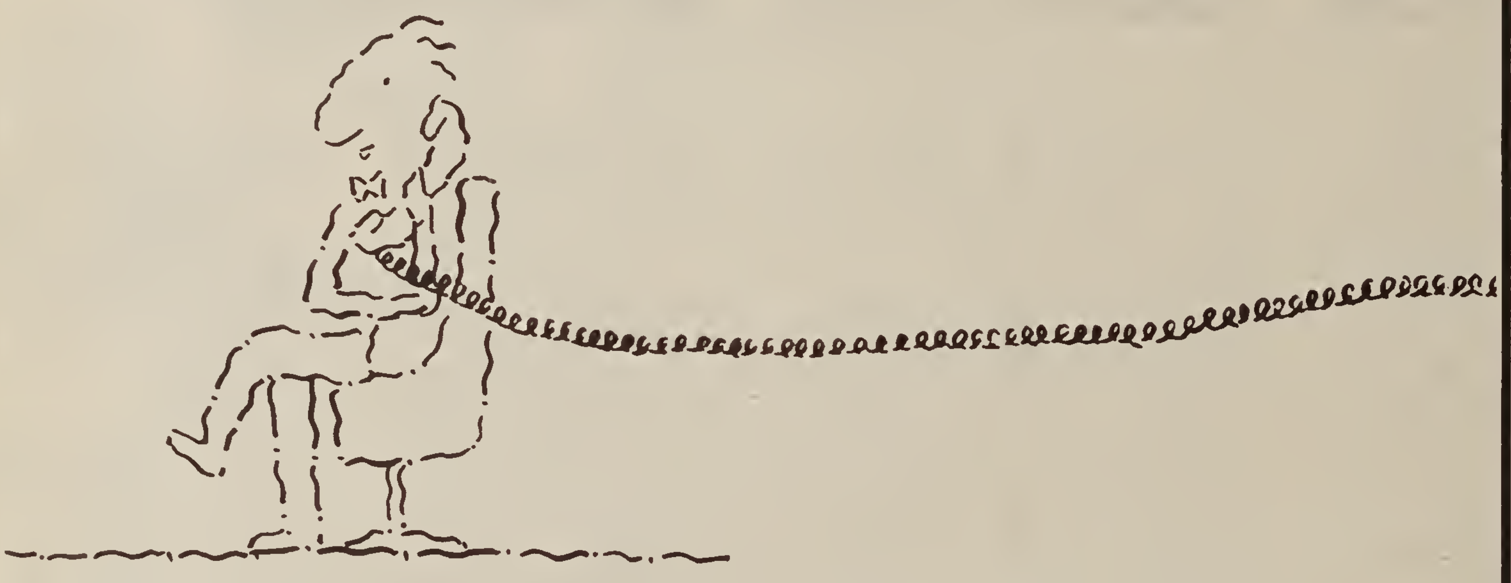
Up, up and away

And the trend lines are headed nowhere but up, according to Federman, who predicted "400 mergers and acquisitions in 1988."

Contributing to the swelling merger and acquisition ranks, Federman speculated, will be venture-funded companies that would have debuted in the public market this year if there had been one left to enter.

Might 1988 merger and acquisition totals be whittled away as companies opt, instead, for strategic alliances, such as the recent and highly publicized Apple-DEC and Microsoft-Ashton-Tate-Sybase accords? Not likely, Broadview's Mintz said.

"Can you name a couple of successful strategic alliances? As far as I can see," he added, "strategic alliance is an elegant buzzword for joint venture — and joint venture means you do nothing, we do nothing, and nothing gets done."



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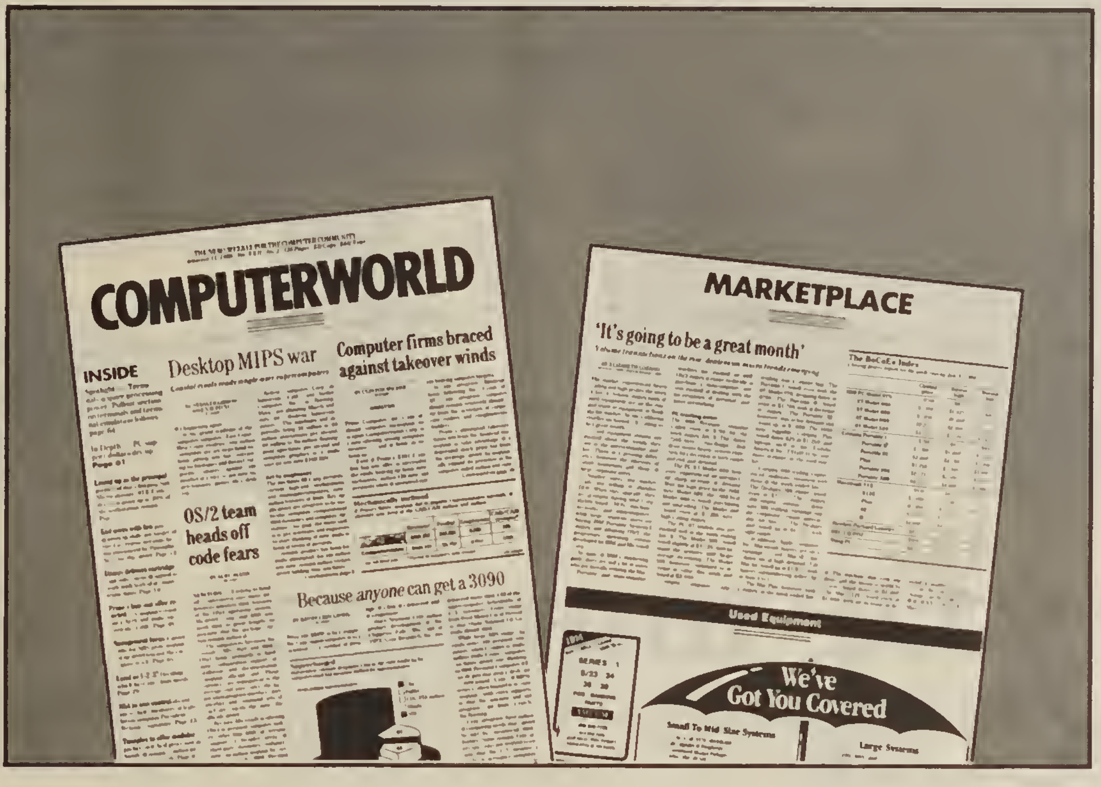

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Unisys

FROM PAGE 1

cal innovation and product-line strength (see chart page 80). In some cases, the former Burroughs sites that were surveyed gave Unisys lower ratings than former Sperry users did.

Dissatisfaction lingers

User interviews independent of the survey found lingering dissatisfaction among many users.

"Most of us were very pleasantly surprised by what happened at the top of the company," said Jim Ault, information systems director at Omaha, Neb.-based Creighton University and president of Use, Inc., the national users group for Sperry customers.

"Now we would like to see that vision and that quality filter down to lower levels," he added.

In an interview at Unisys headquarters in Blue Bell, Pa., Blumenthal confirmed that there have been glitches in his effort to build what he called the critical mass of a $10 billion mainframe giant.

"There were some problems as we moved from two ordering

Continued on page 80

W. Michael Blumenthal

Chairman of the board and chief executive officer

Age: 62

Premerger title: Chairman of the board, Burroughs

Years with company: Eight

Previous employers: U.S. government (Secretary of the Treasury, 1977 to 1979), Bendix (1967 to 1977, elected chairman in 1972)

Education: B.S., University of California at Berkeley; master's of Public Affairs and master's degree and Ph.D. in economics, Princeton University

Quote:

"It's not that two architectures are cheaper than one architecture but that one company can run two of them more cheaply."

James A. Unruh

Executive vice-president and board member

Age: 46

Role: Leads management team in developing and executing the annual financial plan; oversees international operations

Premerger title: Executive vice-president of finance, Burroughs

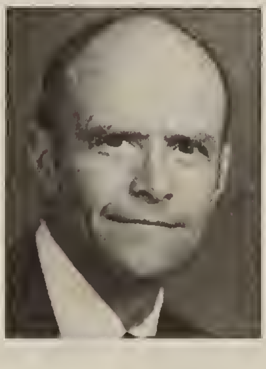
Years with company: Six

Previous employer: Memorex

Education: B.S., Jamestown (N.D.) College; MBA, University of Denver

Quote:

"Companies are automating in a distributed way much more than they used to. That's where the growth is."



Hollis L. Caswell

Senior vice-president; president of product and technology operations

Age: 56

Role: Oversees development, manufacturing and procurement of commercial product line

Premerger title: Senior vice-president, Burroughs; president, Burroughs System Products Group

Years with company: Four

Previous employer: IBM

Education: B.A., Carleton (Minn.) College; master's degree and Ph.D. in physics, Cornell University; master's degree in management, MIT

Quote:

"We would like to make the corporation less dependent on any specific [hardware] architecture."

Jan Lindelow

Senior vice-president, corporate marketing and services

Age: 42

Role: Coordinates Unisys's commercial business marketing, service and product planning strategies

Premerger title: President of commercial marketing, Sperry

Years with company: 17

Previous employer: Independent consultant to IBM customers in Europe

Education: Master's degree (Swedish equivalent) in electronics, Royal Institute of Technology in Stockholm

Quote:

"Progressive companies have realized that information technology is probably their best vehicle to become more competitive in their own industries."

Blumenthal builds mighty fortress

Unisys Corp. Chairman and Chief Executive Officer W. Michael Blumenthal is by far the most powerful U.S. computer executive who has not devoted his entire career to the industry.

Blumenthal's life story reads like a novel, beginning with his family's escape from Nazi Germany. It continues with a boyhood spent in mainland China, an economics professorship at Princeton University and the chairman's job at manufacturing giant Bendix Corp.

Serving as bookends to the Bendix stint were two government jobs, the second as President Jimmy Carter's secretary of the U.S. Department of the Treasury from 1977 to 1979.

From there, Blumenthal moved to Burroughs Corp. and, seven years later, engineered the computer industry's largest merger in history, the formation of Unisys.

Blumenthal was interviewed in his office in Blue Bell, Pa., by Senior Editor Clinton Wilder and Midwest correspondent Jean S. Bozman.

How does Unisys differentiate itself from the other members of what used to be called the BUNCH, as well as from other competitors?

The BUNCH, I think, is dead. It doesn't exist anymore. Honeywell has pretty well dropped out of it, Control Data is a very much smaller company that really is not in the same range anymore, and NCR is specialized in certain areas, although it's a very good company. Burroughs and Univac have disappeared, and Unisys is there [in their place].

We are very different from IBM and DEC. DEC doesn't go up as high [in processing power] as we do. You can go from the smallest A 1 to the largest A 17 system and throughout the 1100 line without ever reprogramming. And the 1100/90 does very well in number-crunching. The advantages of having that kind of variety far outweigh the cost.

Strictly from a financial standpoint, however, isn't it much more expensive to maintain two architectures?

It's more expensive than having one single architecture, but on the other hand, one single architecture can't meet all these different needs.

That's like saying, "Wouldn't it be nice if General Motors only made a Chevy." Then you'd have huge factories totally focused on just turning out a Chevy. That would be great, except not everyone wants to buy a Chevy.

The market is segmented, so that when we merged these two companies, we got different models that met different market requirements.

At the same time, we could merge those parts of the design and production process that don't affect the final product and the differences in the final product.

"A POTENTIAL customer can feel secure now in the knowledge that Unisys is a large, financially strong company, one of the largest in this field."

W. MICHAEL BLUMENTHAL
UNISYS CORP.

What about customer reports of delays in software deliveries and in deliveries of spare parts late last year?

I think a lot of people expected a lot of problems with the merger. We did our very best to minimize that. On balance, I would say the results were stupendous and that very little serious happened.

Are there areas in which there were glitches? Of course there were. I think the single greatest problem we had was in the ordering and delivery system. As we switched over to one [from two], there were some problems.

Since we want to have a uniformly top-notch level of service, delivery and support, it's been painful to us to have even that happen. But compared with what most people expected and with what could have happened, it was relatively minor, even though we don't consider it minor.

Why should someone who has never before purchased Burroughs or Sperry equipment purchase Unisys equipment now?

That kind of potential customer can feel secure now in the knowledge that Unisys is a large, financially strong company, one of the largest in this field.

Permanent backing and support is available.

Another reason is that for the particular need and for the applications that a user has, he will satisfy himself that we have the best solution. We often do, but not in every case. In terms of networking and the A series functions, we are getting a lot of new users.

According to the latest figures, roughly 40% of the entry-level A series machines that have been installed in the last two to three months [of 1987] have been displacing other machines from DEC or IBM.

What's encouraging to us is that the A series so often goes to new users, because people start off with an A 1 or A 4 or A 6, and later on it can grow into an A 15 [account].

When will you retire?

Of course, I might retire from the company. That's not only a possibility, that's a certainty.

My retirement is not imminent.

What will happen to the company when you do?

These things tend to get personalized, but they really shouldn't. It is my responsibility, not only to myself but to the board of directors and to everybody else who works in the company, to make sure that it is run by a group of people, not by one person.

I don't run this company. There are certain decisions that I have to make as CEO, by definition.

I've set up a management board with seven or eight people on it who are the top. I am the cheerleader or the concertmaster from time to time, but essentially they run the company, and if *they* left, you'd have reason to worry.

If I left today, let me tell you a secret, nothing would happen, not even a hiccup. Companies are companies. There are 100,000 people at this company.

Unisys

FROM PAGE 79

and delivery systems to one," he said. "Orders were delayed or little parts weren't delivered and people had to scramble to get them, but I think that's pretty well worked out by now."

Cultural clash

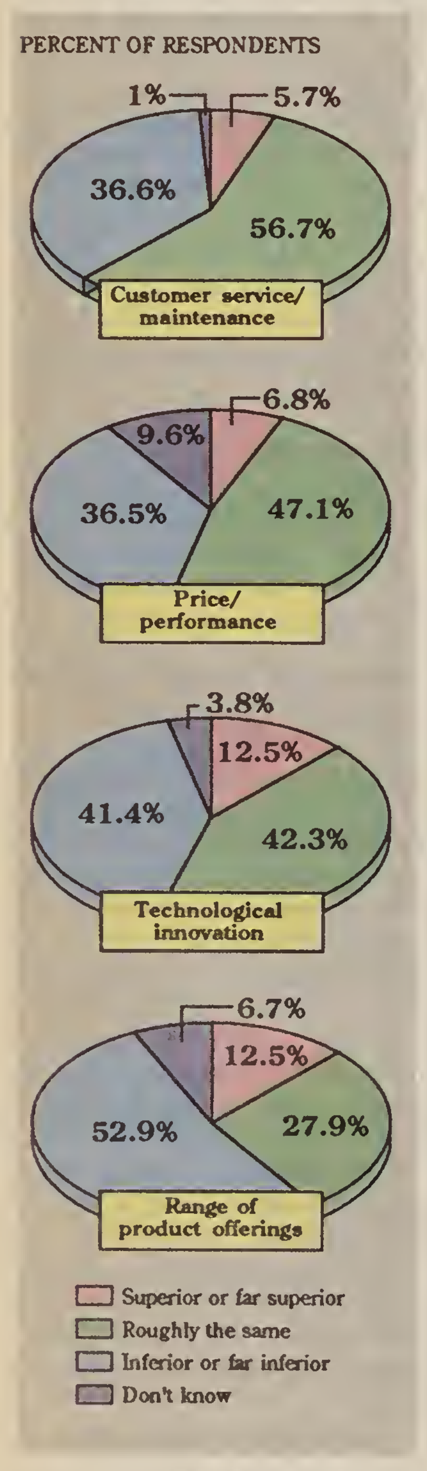
Several users interviewed agreed that many of their earlier complaints have been addressed, but many, especially former Sperry customers, said they have clashed with the Unisys corporate culture.

"It's now a very procedural organization," said Elaine Massa, manager of user and technical services for Connecticut Natural Gas Corp. in Hartford, an 1100/90 shop. "It's a difference between doing what's right for the customer [before the merger] vs. doing it the right way."

For example, the head of Unisys's systems development at a large engineering firm said he can no longer use an on-line software troubleshooting center within Sperry that he used to access with a password given to him by a local Sperry representative. "Now we have to play by the book and use their 800-number service, which is much slower," says the user, who asked not to be identified. "The rep would probably be fired for giving us the password now."

Satisfaction not guaranteed

Unisys customers evaluate the vendor in four areas before and after the merger



INFORMATION PROVIDED BY A *COMPUTERWORLD* SURVEY OF 104 UNISYS SITES (50 FORMER BURROUGHS AND 54 FORMER SPERRY)
CW CHART

Many of the transition-related issues are the natural fallout of merging two multibillion dollar organizations, and many users say that service, support and deliveries have vastly improved in the past few months. "But things were in disarray for too long," DiPalermo says. His office runs four 1100 mainframes at sites in Manhattan and Albany, N.Y.

> "A KEY TO this whole question of how to communicate with image and data and voice is based on the development of common networks, and we will develop this into a major business. That's our strategy."
>
> W. MICHAEL BLUMENTHAL
> UNISYS CORP.

To other customers, however, the merger achieved exactly what Blumenthal intended — critical mass and staying power to compete in the mainframe industry.

"I never saw staying power as a real risk [for Sperry or Burroughs], but I think my boss did," says Eric Thomas, director of information systems and services at Phoenix's John C. Lincoln Hospital, which installed an A 10 system in December. "The fact that I have a boss who's familiar with something other than IBM makes me more comfortable." Thomas's boss is the senior vice-president of finance at the hospital.

The mainframe power

Beyond maintaining customer satisfaction, Unisys must meet the challenge of preserving the future growth path of its mainframe customers. The backbone of Unisys's product line will continue to be mainframes, even as smaller, mid-range systems ship in ever-increasing volumes. Users can also expect Unisys to add more fault tolerance to the A and 1100 series.

Rather than being dinosaurs, mainframes will serve Unisys as a focus for other products and services, Blumenthal says. "The mainframe is a very important centerpiece for what we do," he explains. "That is because those of our customers who have mainframes are, by definition, also those who are the first target for anything else that we can offer."

However, Blumenthal expects the growth in Unisys mainframe sales to remain slow, keeping corporate revenue expansion limited for the near future. Analyst William Easterbrook of Kidder, Peabody & Co. estimates that Unisys revenue will increase only 2% this year, although some analysts' growth estimates are slightly higher.

Opportunity knocks

Far more promising than mainframes are opportunities in networking and fourth-generation languages, Blumenthal says.

"We see a real emphasis on ease of programming and ease of communication," he adds. "That's what people are asking for."

To address that need, Unisys has taken two important steps, Blumenthal explains. The company established a development group focused on fourth-generation languages, and it completed the acquisition of T1 communications vendor Timeplex, Inc. in Woodcliff Lake, N.J., for approximately $360 million late last month.

Critical expertise

Timeplex, a firm long rumored for a possible IBM alliance, gives Unisys data communications expertise considered absolutely critical for large systems vendors to meet user needs.

The acquisition continued a trend of systems and networking vendor alliances last year, including IBM's with Network Equipment Technologies Corp. and Data General Corp.'s with Nippon Telephone and Telegraph.

Slimming down

Unisys's major divestitures and acquisitions since the merger

Divestitures			
Business	**Buyer**	**Price**	**Date**
Sperry Aerospace	Honeywell	$1.02 billion	November 1986
Memorex	Memorex management group and investor Eli S. Jacobs	$510 million	December 1986
Burroughs' U.S. business forms division	The Standard Register	$115 million	June 1986
Burroughs' international business forms and office supplies division	Clayton & Dubilier	$54 million	December 1986
Sperry Marine Systems	Newport News Shipbuilding and Drydock	$70 million	March 1987
Sperry Microwave	Hercules Aerospace	$42 million	December 1986
Sperry equity stake in Tokyo Keiki, a Japanese equipment distributor	Tokyo Keiki	$65 million	1986
Miscellaneous small business operations, real estate and other assets	Various	$120 million	1986
Acquisitions			
Timeplex	Unisys	$300 million	November 1987

CW CHART

"We think that the T1 backbone networks are, for the large Fortune 1,000 and similar-size government organizations, where the market is developing," Blumenthal says. "A key to this whole question of how to communicate with image and data and voice is based on the development of common networks, and we will develop this into a major business. That's our strategy."

Timeplex forms the nucleus of Unisys Networks, a new corporate unit responsible for enterprisewide networks and network management systems.

To underline the unit's importance, former Timeplex President Edward Botwinick reports directly to Blumenthal as president of the unit and is expected to become a Unisys senior vice-president at the next board meeting.

"The Unisys Networks strategy will be to develop a capability which can advise on, design, implement, install, support and, if necessary, service integrated networks," Blumenthal says. "We have a good part of that ca-

Continued on page 84

The art of manufacturing

The Power of 2, as the Unisys Corp. slogan goes, is best seen in the area of manufacturing.

That is where Sperry Corp. and Burroughs Corp. have been able to most visibly merge their operations by pooling their resources and streamlining their overhead.

The proprietary chips that will propel the Sperry 1100 and Burroughs A series architectures into the future will soon be designed, fabricated and tested in just one place — a state-of-the-art semiconductor facility in Rancho Bernardo, Calif.

The former Sperry semiconductor plant in Eagan, Minn., would be closed now, were it not for a heavy demand for 1100/90 chips in the latter part of last year, says Unisys Chairman and Chief Executive Officer W. Michael Blumenthal.

Mass production of the proprietary chips will be carried out by Intel Corp. and Motorola, Inc., Blumenthal says.

At Unisys, mass production should become as modular as IBM's manufacturing of Personal Computers or 9370 mid-range models — that is, with multiple models all based on the same chassis.

"You can look out to a point in time where each box would get its frame, power and cooling system and a bus structure as it came down the assembly line," says Hollis Caswell, president of the Unisys System Products Group. "The only way you could tell which machine it was would be when the CPU got plugged in."

A great deal of modularity is already built into the A series computers, both large and small.

Research and development groups that support the manufacturing effort have also been combined, notably in Unix and fourth-generation languages.

"Unix is a neutral ground for people who came from both the Sperry and the Burroughs side of the company," Caswell says.

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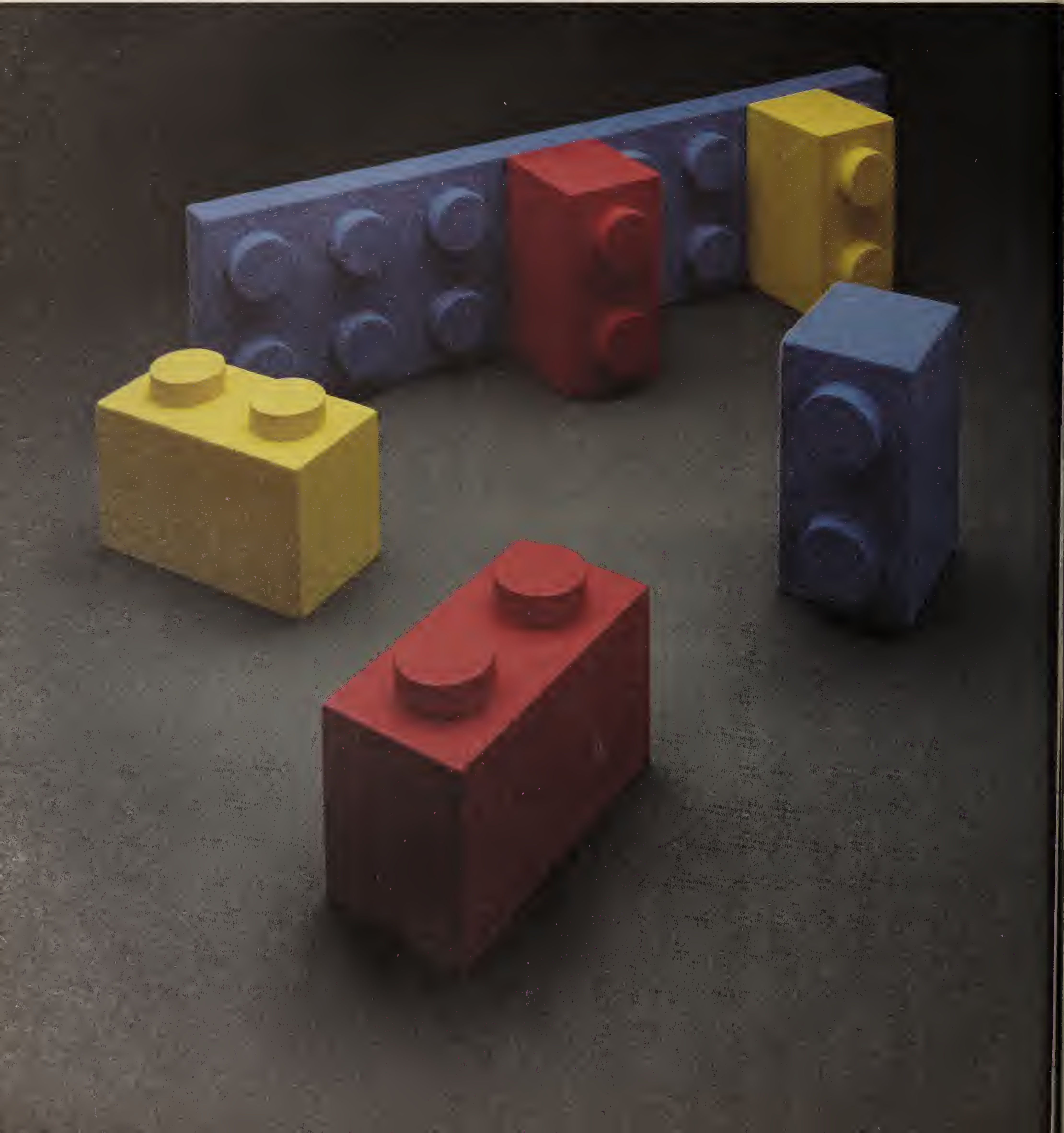

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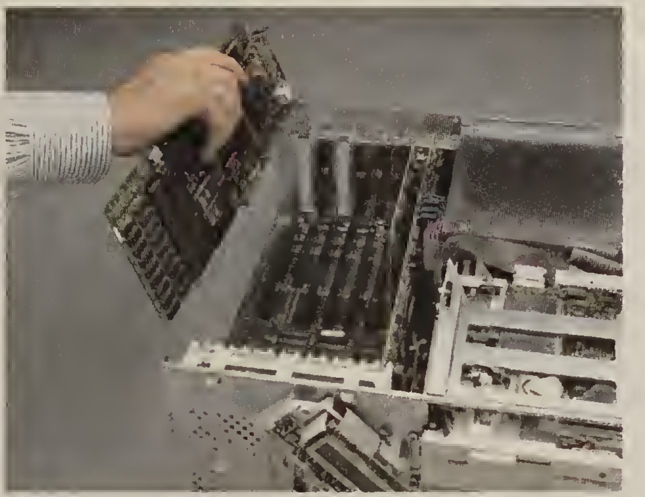

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Dual lines to live forever and a day

BY JAMES CONNOLLY
and JEAN S. BOZMAN
CW STAFF

For Unisys Corp. mainframe users wondering how long the diverse Sperry Corp. and Burroughs Corp. architectures will live, Unisys Chief Executive Officer W. Michael Blumenthal has a brief answer.

"Forever and a day," he promises.

Unisys officials vow that the Sperry 1100 line and the Burroughs A series will be enhanced as important product families under the Unisys umbrella. Any merging of the mainframe lines will be through communications links — primarily for users who have both architectures — and the use of common software, such as fourth-generation languages. The company warns observers to stop watching for common mainframe platforms.

Meanwhile, the company says it will expand its efforts in areas such as fault tolerance, mid-range systems and Unix, where it has already unified the Sperry and Burroughs offerings.

Bridging the gap

The company plans to continue Sperry's development efforts and to extend a string of recent enhancements such as memory boosts and price cuts. One goal is to narrow the gap between the high-end 1100/94 and the A17 models, which are roughly twice as powerful.

Fred R. Meier, Unisys vice-president for corporate program management, says that while the breadth of the gap varies according to which applications are running, 1100/90 follow-on systems now under development will narrow that gap. However, Meier notes that only a "quite vocal" minority of 1100/90 users are at full capacity with the four-CPU 1100/94. He says replacements for the smaller 1100/70 systems will ship by the end of this year.

Meier says one key strategy is to port Sperry's Mapper — a fourth-generation language that he says is user-oriented — to the Burroughs A and V series and to migrate Burroughs' Linc — a fourth-generation language intended for high-performance applications — to the 1100.

"We would hope that Linc will get spread over to the Sperry direction," says Judy Turner, systems and development manager for Pittsburgh grocery retailer Giant Eagle, Inc., an 1100/92 shop. "I think it could do things for our productivity."

Blumenthal says that many of the common applications will be written for Unix environments and that Unisys, which acquires Unix systems from several OEM suppliers, sets itself apart from other Unix vendors by adding value. "We add a lot of features and functions to the basic capability of Unix. We put a Unisys custom element into it," he adds, noting that Unisys hopes to double its Unix-related sales from $300 million in 1987 to $600 million this year.

At the low end, the Unisys strategy combines its proprietary BTOS, Unix and Microsoft Corp.'s MS-DOS and MS OS/2, which Meier says Unisys recognizes as desktop standards. He cites the Unisys B20 multiuser system as a key integration tool for mixed environments.

Unisys

CONTINUED FROM PAGE 80

pability now, but we will extend it and develop it further." Such networks may include IBM and Digital Equipment Corp. machines.

Unix remains a growing product area for Unisys, with sales jumping from $100 million in 1986 to $300 million last year. Unix business in 1988 may double that figure, according to Blumenthal.

Bulwark of the mid-range

As competitors like Sun Microsystems, Inc. and NCR Corp. ride the Unix wave and IBM and DEC also incorporate the Unix standard, the AT&T-developed operating system will prove increasingly critical for Unisys as a bulwark of the mid-range — where Unisys must post double-digit revenue growth to offset the slower mainframe market.

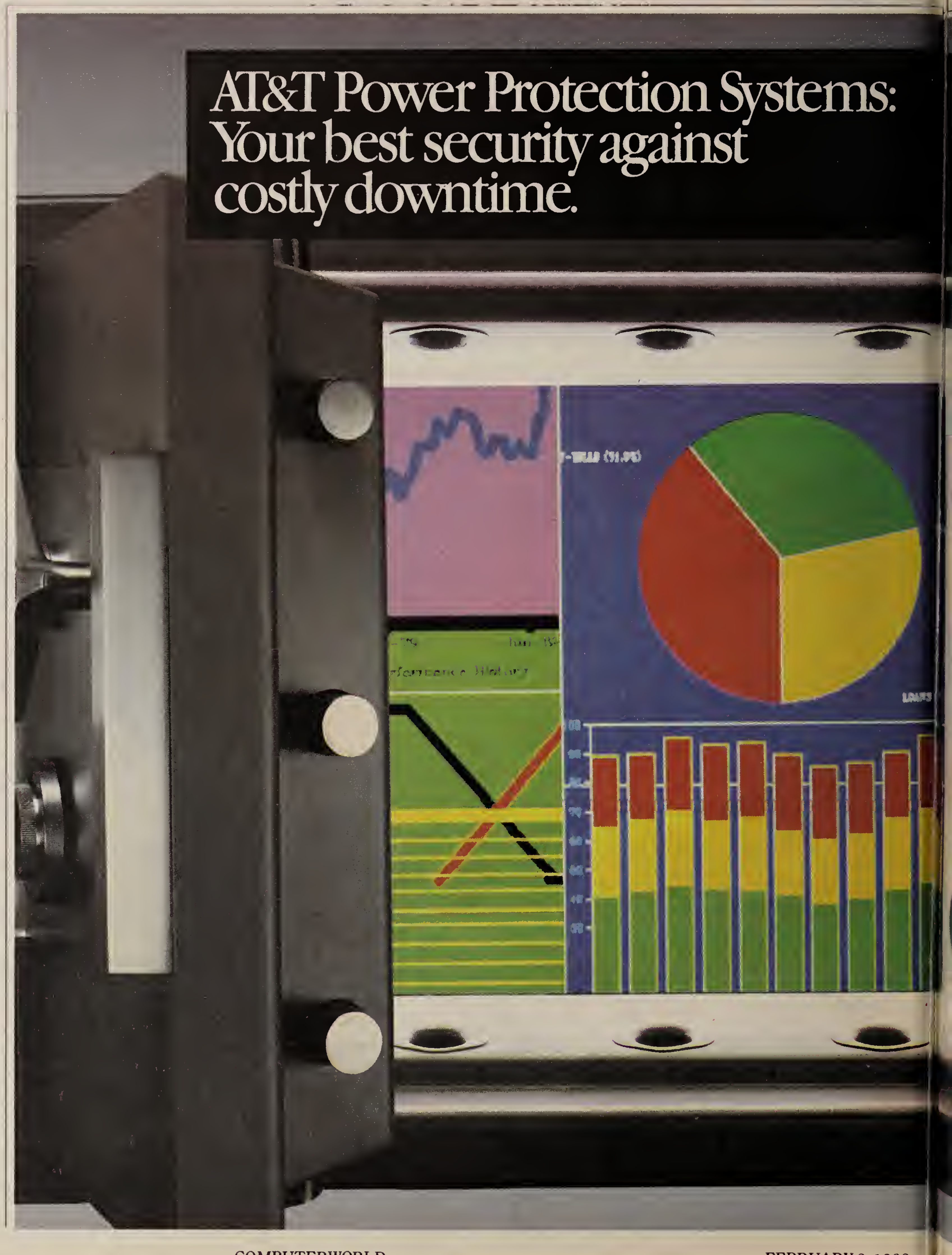
"Profit margins are up now, higher than they were for Burroughs or Sperry," says John Rutledge, computer analyst at Dillon Read & Co. "But to meet the challenge later on, they have to keep the new product flow very strong and do more with Unix." As Unisys heads for the 1990s, it will continue to face, as a combined company, the very danger that prompted the Burroughs-Sperry marriage: the decline of mainframe growth as MIS operations downsize and distribute.

"This has nothing to do with the merger, but we are already de-emphasizing Sperry," says one 1100/92 user. "We're not sure what we're going to do, but the operational costs are much more advantageous with DEC."

Last one to go

The resignation of former Sperry President Joseph J. Kroger at the end of last year was a symbolic milestone for Unisys — removing the only Sperry representative from the office of the chairman and the board of directors.

Blumenthal's divestiture program, which raised more than $2 billion from the sale of various Sperry and Burroughs businesses (see chart page 80), has been completed, restoring faith on Wall Street and the financial freedom to make acquisitions, like that of Timeplex.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By all accounts, Blumenthal has made the computer industry's largest merger a financial success. But he and the company still face, perhaps, an even greater challenge: restoring the faith of users both stung by inconsistent service levels since the merger and bombarded with new distributed computing options.

"Departmental systems, distributed processing, particular applications, networking, tying things together, being able to talk to each other . . . we're spending a lot of time and money developing those areas," Blumenthal says. "Because if we put our minds to it, we can beat the competition with those products, and that's where the growth is."

Mid-Atlantic correspondent Alan Alper contributed to this story.

Unisys holds its own as financial services market comes under siege

BY ALAN ALPER
CW STAFF

In the financial services market, a key indicator of the firm's performance, Unisys Corp. has not gained very much ground on IBM in the past 18 months but has not lost any, either.

"One and a half years ago, some customers chose not to do business with us because of our size," says O. G. Greene, president of Unisys's Atlanta-based Financial Systems Division. "Those same customers are more receptive to us now because of our size."

As a result of deregulation of the financial services industry, almost every firm in the field is clamoring for the competitive advantage that information technology can provide. But as competition has expanded, so has the number of hardware, software and services suppliers.

Unisys now competes as much with Apollo Computer, Inc. and Sun Microsystems, Inc. in workstations as it does with Digital Equipment Corp. for medium- to large-scale processors. Vendors such as Tandem Computers, Inc. and Stratus Computer, Inc. have made inroads into the transaction processing market segment, where high systems availability is key. Moreover, Unisys is still battling with IBM and NCR Corp. for the hearts, minds and pocketbooks of banks worldwide.

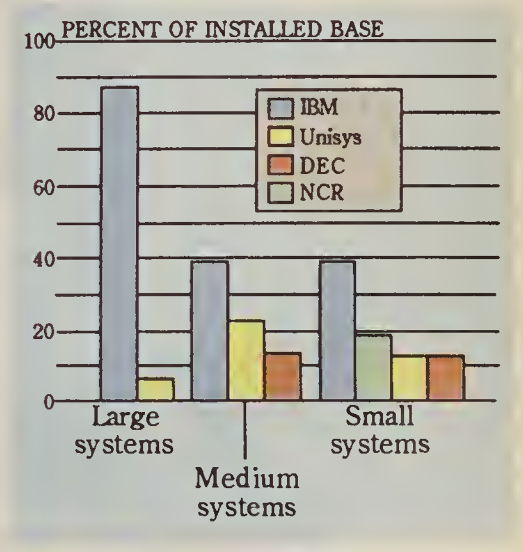
For Unisys, "it's a market that is under siege," says Dave Moschella, an analyst with International Data Corp. in Framingham, Mass. He adds that Unisys has many good products but does not have "a wealth of software people with expertise."

> "ONE AND A HALF years ago, some customers chose not to do business with us because of our size. Those same customers are more receptive to us now because of our size."
>
> O. G. GREENE
> UNISYS'S FINANCIAL SYSTEMS DIVISION

Through Burroughs Corp. systems, Unisys continues to dominate the document processing market. Burroughs had also developed a branch automation system to enable a bank's customer service representative to access all customer information and sell all products and services from a single workstation.

The firm's recent acquisition of wide-area networking firm Timeplex, Inc. should enable Unisys to better challenge IBM for contracts with larger banks, Unisys's Greene says. Timeplex's T1 and packet-switching technology will provide those institutions with a way of linking offices that are geographically dispersed, he adds.

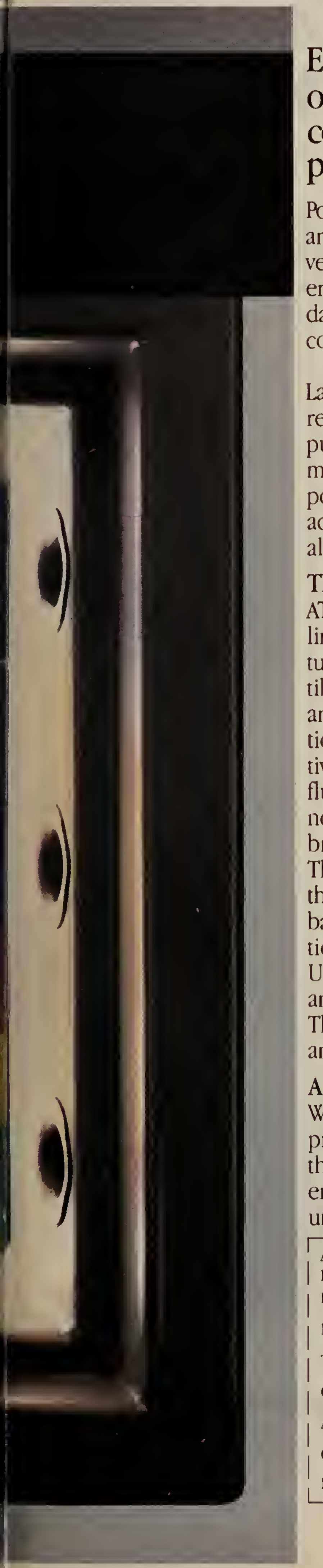
The power of No. 2
Hardware systems in use at U.S. commercial banks, 1987



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

The company has made recent inroads in the insurance industry — a segment long-considered an IBM bastion — with its family of Unix-based departmental processors.

In both the large banking and insurance markets, Unisys's strategy is to coexist with IBM by building bridges to that company's Systems Network Architecture, Greene says.



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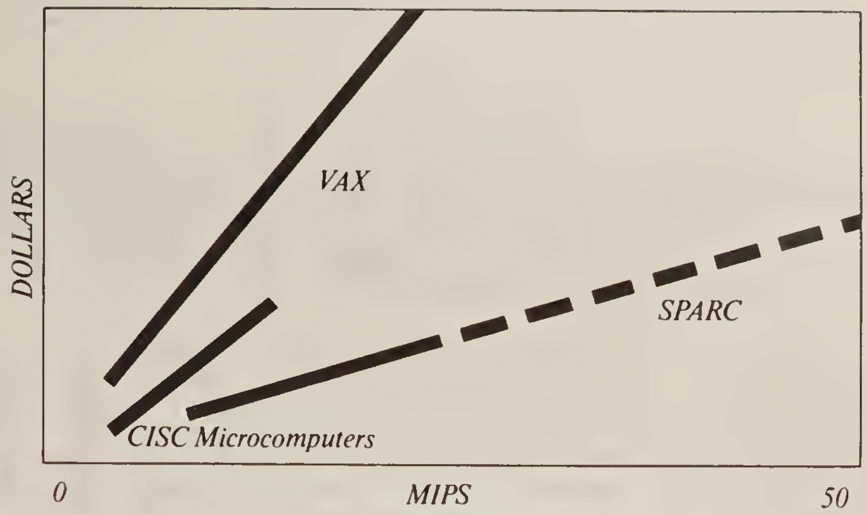

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COMPUTER CAREERS

Brakes on in auto industry hiring

But manufacturing, engineering grads get green light in MIS staffing

BY DENA ALLMAN
SPECIAL TO CW

Although hiring is slowing in the automotive industry overall, MIS managers say opportunities exist for professionals with backgrounds in engineering and manufacturing.

Industry trends driving the demand for MIS personnel include implementing technology to increase production efficiency and looking to information systems to provide an edge over the competition.

College graduates with degrees in electrical or mechanical engineering and a minor in computer science may also find openings in the professional development programs of large auto makers. MIS managers seek professionals educated in engineering because they adapt well to the constantly changing needs of the industry and can pick up the needed applications knowledge on the job.

MAP, OSI literacy useful

"It's helpful if the candidates understand MAP [Manufacturing Automation Protocol] and OSI [Open Systems Interconnect] standards, but it is not required right away," says Ron Keil, manager of automotive support systems at General Motors Corp.

However, those who want to progress in the industry must possess the ability to learn about these areas quickly, Keil adds. Computer-aided design and manufacturing (CAD/CAM) knowledge is also expected to be acquired on the job.

At Ford Motor Co., Hans Kuschnerus, manager of engineering information systems, seeks a higher level of experience.

"Engineering graduates who have practical experience in the field and who understand the applications involved are preferred over those trained in a theoretical approach to the industry," Kuschnerus says.

Workplace creativity

For experienced MIS professionals, the industry is attractive because of fast-changing applications requirements and a less structured atmosphere. Together these factors allow the professionals more creativity than traditional MIS shops.

"After three to five years at Ford, information systems employees are expected to simplify, improve and mechanize their working environment," Kuschnerus says. "Ford's goal is to constantly streamline the process from engineering to manufacturing to sales. To accomplish this process improvement, employees must be willing to generate new ways to improve production."

The highly competitive nature of the industry, especially among the top companies, requires MIS managers to focus on developing strategic manufacturing systems that provide an edge over the competition.

> "ENGINEERING GRADUATES who have practical experience in the field and who understand the applications involved are preferred over those trained in a theoretical approach to the industry."
>
> HANS KUSCHNERUS
> FORD MOTOR CO.

At Chrysler Corp., the factory information systems department carries out all of the manufacturing planning, including coordinating which plant will manufacture certain automotive parts. According to department manager Bob Duran, MIS professionals in his department should possess hands-on experience in CAD/CAM applications and the electronic distribution and generation of operations.

"Information systems professionals actually show the plant employees how to build a car through graphics," Duran says. Information systems is also responsible for detailing how to meet quality requirements and transfer the information to the plant, he adds.

Chrysler's initial MIS hiring is done at the company's Manufacturing and Technical Development Center in Detroit. However, employees can eventually move to other areas of the country where the company operates manufacturing plants, Duran says.

Internal training offered

Ford looks to hire its MIS managers from within the company rather than conduct an outside search. The company also runs a two-year job rotation and training program for computer science graduates. Trainees work in the information systems departments that support engineering, sales, manufacturing or finance. They then decide which area will best meet their career aspirations.

Though the industry's MIS hiring activity is currently being bolstered by the increased use of technology, information systems is not immune from overall streamlining efforts.

"Ford is currently being very selective with its hiring activity," Kuschnerus says. "Work force reductions are being caused by the need to stay competitive within the industry. As Ford's market share goes up, hiring may increase as well."

Little growth in MIS hiring is expected in the future at GM, Keil says, but despite cutbacks elsewhere, the information systems organization is "holding its own."

MIS future healthy

The use of technology, such as electronic data interchange (EDI) systems, will continue to require the industry to maintain healthy information systems staffs, Chrysler's Duran says. In approximately five years, he predicts, the industry will advance to completely designing and manufacturing a car electronically with the help of computer technology.

Ford is currently developing a corporate strategy for EDI, while GM is trying to implement smaller versions of the technology in a few areas of its manufacturing process, according to Jim Moravec, associate director of the Automotive Industry Action Group.

Allman is a free-lance writer based in Chicago.

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INSIDE

Common Ground

DEC's Application Centers for Technology are places where the company's interests converge with those of independent software vendors and users looking for teamed assistance. One vendor and one user provide perspective on what these demonstration centers have to offer. Page S4.

Ask the Vendor

Vendors respond to questions about moving files between data bases, code management, electronic publishing and more. Page S6.

From V to X

The ability to run their packages on a full range of hardware is one reason DEC is hot with third-party software vendors. Page S7.

Product Chart

A detailed guide to DEC-compatible data base management systems. Page S8.

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Demand may not be deep enough to support all of the migratory suppliers, especially if DEC decides to join the action

VAX ATTRACTS SOFTWARE FLOCK

BY BARBARA SEHR

BART GOLDMAN

After three decades of drought, the long, dry winter of discontent is over for would-be users of applications software that would run on DEC machines. The official company line says, "Digital has it now," and to a large extent that is true. As Jerry Knaus, a software engineer at Jeppesen Sanderson, an Englewood, Colo.-based maker of navigational aids for U.S. airlines, says, "Now if we need something, we can usually find it someplace."

In the days before the VAX series, finding applications for Digital Equipment Corp. systems was not a pleasant prospect. Ironically, while DEC's was frequently the hardware of choice for software developers, few applications packages were actually developed for DEC systems. For the most part, DEC supplied the iron, and the customer supplied the application expertise.

What made this situation viable for those times was both the quality of the machines and the nature of those who used them.

Equipment design counted for a lot, according to Douglas Loomer, financial data analyst at Teradyne, Inc. in Boston, a company introduced to DEC by the PDP-11/20 minicomputer back in the mid-'70s.

"There weren't a whole lot of applications available [for DEC systems] back then," he says. "But Digital hardware was a lot easier to use than IBM."

Then too, DEC hardware usually rested in the hands of users more inclined toward developing their own applications rather than accepting some broadly based off-the-shelf package.

The times are changing, however, both at user sites and at the old mill in Maynard, Mass., that serves as DEC headquarters.

While some users still prefer to "roll their own" software, many former do-it-yourselfers have decided they would rather purchase ready-made programs. CH2M-Hill, a Corvallis, Ore.-based engineering consulting firm with 26 U.S. offices, has written some 500 of its own engineering analysis programs for its cluster of 13 DEC VAX CPUs.

Still, Wayne Yarnall, CH2M-Hill's product manager for print services, says he would rather buy an off-the-shelf program than take up staff time to support the software. "I'd rather buy it from somewhere else and call their people to come in and support us," he says. "Our people are occupied enough with everyday systems administration."

At the same time, a number of factors at DEC, including changes in attitude and product line, have produced a substantial crop of applications from third-party software suppliers. International Data Corp. (IDC), a market research firm based in Framingham, Mass., estimates that about $550 million worth of third-party applications software was sold in the DEC market in 1987 in addition to $175 million or so sold by DEC itself.

"There's a ton of software available for the VAX," Loomer says, noting that the introduction of the VAX made it easier for third-party software houses to convert their packages for DEC users. Rising VAX sales and encouragement from DEC also boosted the availability of applications

---

Sehr is a free-lance writer based in Seattle.

VAX attracts

FROM PRECEDING PAGE

packages, he says.

In addition to developing horizontal spreadsheets and office automation products to go along with its increasing emphasis on connectivity, DEC is actively encouraging the development of third-party vertical applications software for its VAX series.

Just through its Cooperative Marketing Program (CMP), DEC has assembled between 100 and 120 selected software houses and OEMs, which together produce about 300 different packages targeting such vertical markets as accounting, health care and scientific development.

The company maintains individual industry groups to keep tabs on developments in a particular vertical market and to react accordingly. "The key to penetrating a market is to have the right portfolio," says Jim Willis, group manager of distribution, marketing and sales for DEC's business systems.

There are a couple of very sound reasons that DEC would choose to stimulate third-party software development.

One is a practical recognition of its own limitations. "I think the company recognizes that others do a better job developing software than DEC can," says Wayne Smart, systems development engineer for Fleetwood Enterprises, Inc. in Riverside, Calif., a manufacturer of mobile homes and recreational vehicles.

"DEC recognizes that others do a better job developing software than it can."

WAYNE SMART
FLEETWOOD ENTERPRISES, INC.

Smart adds that DEC has always been recognized for its strength in hardware, not software.

"With the huge base and fast growth of the market, it is impossible for Digital to satisfy the demand by itself," says Marty Gruhn, executive vice-president of The Sierra Group, a market research firm in Tempe, Ariz.

Selling point

Another reason is the fact that plentiful software helps to sell hardware.

"Experience shows that users often choose their software first, then buy the hardware that will run it," says Dennis Freeman, a spokesman for MCBA, a developer of accounting programs for the VAX. Even current DEC users are likely to expand their use of the company's hardware if they see a need that is being filled by a new application.

Burt Pickard-Richardson, second vice-president at Northern Trust Co. in Chicago, says that although DEC systems already constitute a significant portion of the financial institution's on-line capacity, there is room for more, should the right applications software come along. "If a Digital salesman asked me what would motivate me to buy another $2 million in hardware, I would say, simply, a superior application," he says.

"We're still looking for a trust package that is large enough to meet our needs."

In fact, despite a major increase in the software crop, growth remains somewhat uneven. For one thing, not all fields have produced equally. While some applications have proliferated, other vertical markets remain sparse.

"The environment of most off-the-shelf packages is not what we are accustomed to," CH2M-Hill's Yarnall says. "There's not a whole lot of selection in the DEC world for our particular needs."

Doubts also prevail among some users about the prudence of using multiple third-party software without having some kind of interface that ties it together.

"There is a definite lack of a consistent interface within third-party software products," says Mark Schnegg, systems manager at *The Boston Globe,* where multiple VAX systems support between 500 and 600 users in applications ranging from factory automation to graphics.

"It is difficult for someone to have to learn several different function keys for several different programs," he says. "There must be a way to bring these applications together."

Since that way has not yet appeared, the *Globe* turned some of its office automation duties over to a network of Apple Computer, Inc. Macintosh personal computers. The Mac feeds into the newspaper's Ethernet local-area network and thus interfaces with the DEC Vaxcluster.

Anxiety lurks

Finally, DEC users are still apprehensive about the dependability of third-party software and software providers.

Schnegg, for example, complains that on several occasions he has dealt with third-party suppliers that either did not have the facilities to provide the level of support the newspaper required or, worse, went out of business.

"We try to stick with Digital's own applications because we've been burned so many times by third-party sellers," he says.

In recognition of such concerns, DEC maintains admission standards for its CMP that are stricter than some exclusive men's clubs'.

"We look for experts in their field," says Richard Corley, industry marketing manager for health care and pharmaceutical applications at DEC. "We also take great care to develop strong relationships."

DEC requires that its CMP applicants already show an existing base of satisfied customers, maintain an existing sales and support force and prove recognized leadership within a particular market.

The company examines and reviews each product with existing customers of the software house and then performs a technical review of the product within its own facility. CMP applicants must also endure vigorous examination of their financial stability by DEC.

Although this elaborate screening may be reassuring, users can wind up excluding some excellent programs if they confine themselves to software produced only by CMP companies. The long and painful application process may discourage some well-established software houses from joining the program, says Bob Randolph, an analyst with IDC.

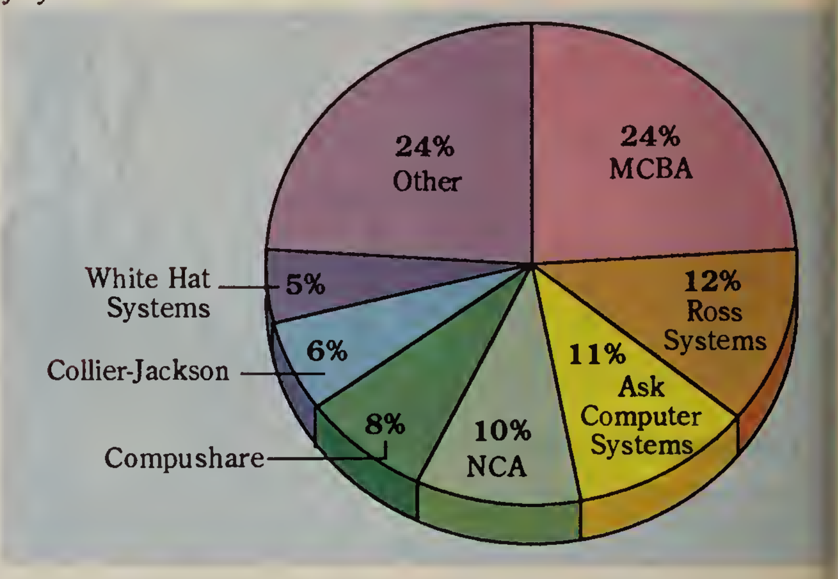
Pressure's on

Randolph performed a study of the CMP last year and found general satisfaction among its participants. That satisfaction, however, seemed to decline in direct relation to the size of the member company.

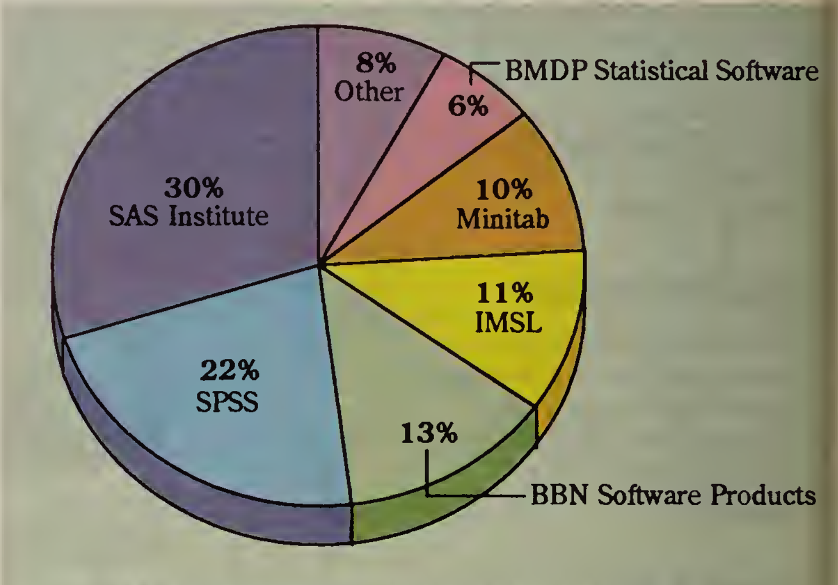
There may be other reasons that some software houses choose not to go along with the CMP, Randolph says, especially those that can adequately sustain themselves against DEC within their own market. Some companies may not want to share their customer list or may not want to lose their independence, he says.

High scores in VAX software

Market share division among suppliers of VAX accounting software, July 1987



Market share division among suppliers of VAX data analysis software, December 1987*



* Includes software installed on DEC VAX systems only; does not include Microvax systems

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Competition within the applications market is becoming increasingly heated, whether or not the developer is a CMP member. Vendors whose businesses were once restricted to the realm of IBM mainframes are even joining the fray.

"IF A DIGITAL salesman asked me what would motivate me to buy another $2 million in hardware, I would say, a superior application."

BURT PICKARD-RICHARDSON
NORTHERN TRUST CO.

Crowding on the field

At Teradyne — a manufacturer of automatic test equipment — all the company's general ledger, accounts receivable and payable and payroll processing is handled by a software accounting system called AP Plus from McCormack & Dodge Corp. in Natick, Mass. Loomer says he is impressed by the way the software adapts to the DEC environment.

Pleased as he is with the M&D crossover, Loomer points to Cullinet Software, Inc.'s 1986 announcement that it would begin targeting VAX applications as the real watershed for that market. Cullinet, the largest independent supplier of mainframe software, had always pledged allegiance to IBM, he says. When the Westwood, Mass.-based company — now in DEC's CMP — broke through the IBM curtain, it was a signal for other traditional Big Blue houses to follow.

Whether Cullinet's decision to test the VAX waters will prove to be as beneficial for the company as for its users is uncertain, however, according to IDC's Randolph. The problem, he says, is that other makers of relational data bases for mainframes have entered the VAX arena at the same time. Cullinet "is going to find itself in the same condition as it was in the IBM market."

The Sierra Group's Gruhn says this competition is also putting pressure on DEC to improve its own applications products. She says new competition from third-party data base developers has forced DEC to look at its own in-house data base product. Not all emigration or competition is coming from the mainframe direction, she adds.

PC software houses like Ashton-Tate Corp., Oracle Corp. and Wordperfect Corp. are also clambering onto the VAX platform.

Adjusting support

One factor in the DEC market that may take migrant software companies by surprise is the extent of support VAX users require.

Generally speaking, the amount of support is more than PC software vendors are used to providing and possibly more than mainframe software vendors from the IBM environment are ready to provide for the prices they can charge.

VAX shops in particular seem to thrive on tinkering with established packages until they achieve an exact fit with their needs.

A VAX user with packaged software is much like a child with mechanical aptitude who is given an erector set. The possibilities are endless. There are no sacred cows, no matter how well respected or how much of an expert the original product developer is.

Even a respected accounting program such as M&D's AP Plus is not immune to experimentation. Loomer says Teradyne programmers work closely with support people at M&D to customize its package to meet company requirements.

Sometimes, he says, in-house programmers find more capabilities than even the developers had expected. "You have to understand the software," he says. "If you learn its capabilities, you get more out of it."

Fleetwood Enterprises' Smart says his company has tinkered with its MCBA accounting program to adapt it to the needs of its 47 manufacturing plants in the U.S. and Canada.

Another user who believes in exhaustive tinkering and testing is Robert Lovestedt, a systems manager at Weyerhaeuser Co., a giant lumber and paper products company in Tacoma, Wash. Lovestedt oversees facilities that serve a group of scientists and engineers in the company's research buildings in nearby Federal Way.

Weyerhaeuser has been using VAX systems since 1979 and now has a Vaxcluster of six CPUs within Lovestedt's operation. "We've gone from 120M bytes of disk storage to 15G bytes and from eight users to about 150," he says.

Still, Lovestedt's search for comprehensive applications software continues. Because of the nature of scientific and engineering applications, he says, his operation is not tied to one particular package. "We tend to run some experiments with a package and then move on to the next one," he says.

Profit squeeze

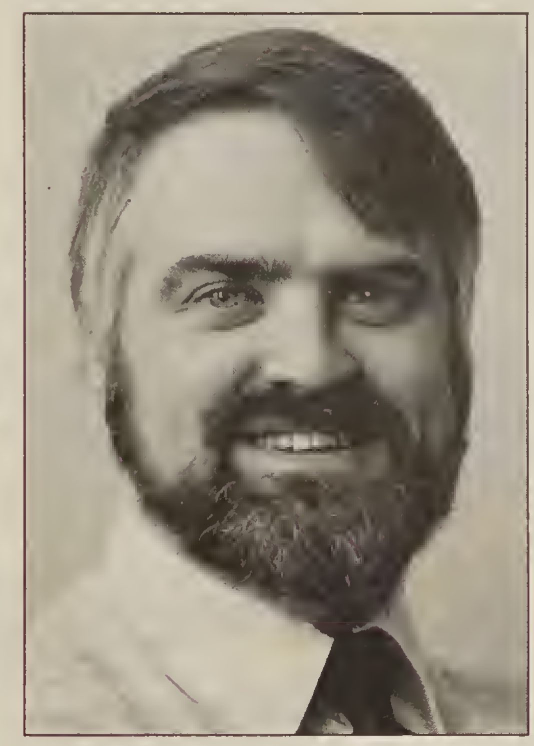
The price of a particular package can determine the degree of user experimentation. "If a package costs only a few thousand dollars, it is probably cheaper to just buy a number of packages and evaluate them all," Lovestedt says. "Once a package goes through the $20,000 threshold, our testing procedures change."

That change could mean trying out a package at the vendor's expense. While PC users may have to go to a computer store, independent software vendors in the VAX market make it a point to make sure their products work on a customer's own hardware configuration.

"We don't trust anything until we get it hooked up and try it," CH2M-Hill's Yarnall says. "If it works, most likely we'll buy it."

Because of the need for this level of demonstration support, even the most basic packages for the VAX series are priced much higher than what a similar package might list for on a PC.

Wordperfect, a popular word processing package from Orem, Utah-based Wordperfect, is available in both markets, but the VAX version sells for more than 10 times the cost of the PC list price.



The Boston Globe's **Schnegg**

For many VAX users, such as Jeppesen Sanderson's Knaus, price is at the bottom of the list of considerations. "Need is far more important," he says. "[We ask], 'Does the product do what we need?' "

Still, because DEC built its company as a provider of low-priced alternatives to mainframes, there is still some price consciousness in the VAX market.

Traditional IBM software houses will have some difficulty in the VAX market for that reason, IDC's Randolph says.

"The DEC world will not pay $100,000 for a software package," he says. "It may mean that traditional IBM houses will have to cut their prices by about 25%."

Because some of the niches sought by these vendors are limited, conventional economics should require doubling prices rather than reducing them, Randolph adds.

Third parties — especially those that are not part of the CMP — may also have to contend with intense competition from DEC itself, which has stated its commitment to increased software development. DEC's Willis says the company will continue to offer horizontal packages in the future. DEC is no longer just a hardware company, he says. "Our emphasis here changed years ago," he says. "With our networking tools and development tools, we will establish ourselves in the software arena."

Stretching out

Unlike IBM, which has long developed many of its own horizontal applications packages, DEC has not extended itself much beyond its operating systems and network software packages until recently.

In the past few years, however, the company has joined IBM in offering some horizontal packages for the office automation market that can be customized by users. A recent IDC survey shows that 49% of VAX

Continued on page S5

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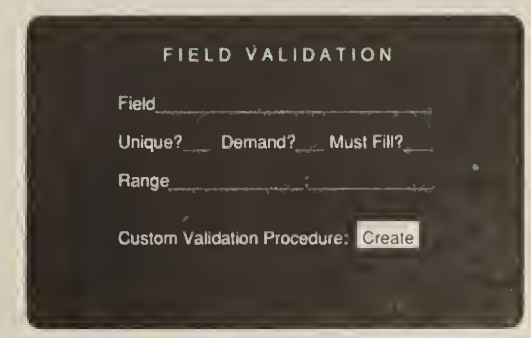

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DEC ACTs display obvious premeditation

BY ALAN RADDING

Vendors elevated to partner status

Persistance of vision helped Computer Aided Decisions, Inc., a Boston-based financial software firm, win a place in Digital Equipment Corp.'s network of Application Centers for Technology (ACT).

ACTs are fully equipped DEC demonstration rooms, each located in proximity to 17 major computer markets throughout the country. Each concentrates primarily on the vertical industry most heavily represented in its location. That specialization is, in turn, reflected in the stock of software available for demonstration on various DEC hardware configurations and in the qualifications of the company's sales and consulting staff.

A team of full-time DEC employees is assigned to each ACT. These employees are knowledgeable about specific industries and capable of demonstrating DEC hardware and selected third-party application software.

Turn on the heat

That Computer Aided Decisions, which began marketing an investment management system to run on DEC's VAX line in 1981, is one of those selected vendors must be attributed, at least in part, to a long campaign of persuasion. According to marketing director Tom Roginski, that campaign was instrumental in steering DEC into the financial services area. At the beginning, Roginski recalls, DEC's interest was lukewarm at best.

Three years ago, however, Computer Aided Decisions' system became the first financial package to receive DEC's stamp of approval. The package's designation as DEC-certified software was a start, Roginski says, but it really meant only that the software was supportable by DEC.

In 1985, DEC began its Cooperative Marketing Program (CMP) for selected third-party vendors. Computer Aided Decisions' portfolio management and trading software — the Expanded Portfolio Valuation System (EPVS) — was the first financial system to be teamed with DEC, Roginski says.

The CMP led Computer Aided Decisions directly into the ACT program, which was launched in August 1986. The company now takes advantage of ACTs throughout the country, although 85% of its market is in New York.

Even in the Boston area, where Computer Aided Decisions maintains a fully configured system at its own offices, the company often uses the local ACT for special presentations. "We have our own facility, but if we are doing a major show, we'll do it at the ACT," Roginski says.

There are several steps involved in selling through an ACT, Roginski explains. First, initial contact with a prospect is made. Usually, a DEC sales agent in the field makes the identification and then contacts Computer Aided Decisions to qualify the prospect.

The second step involves Computer Aided Decisions' speaking directly with the prospect. The software company determines whether the client can use the EPVS product, while the customer decides whether the software is a possible fit. The client goes to the ACT to meet DEC's sales agent and employees from Computer Aided Decisions. The two companies present themselves to the prospect as a team. "The client deals with us as a single entity," Roginski says. At the ACT, the client sees the software operating on appropriately configured equipment and participates in a hands-on demonstration.

Manny Baretto, manager, *at the helm of DEC's New York ACT.* YVONNE HEMSEY

The final step is a trial run at the ACT for actual users from the prospective purchaser. By this time, any refinements suggested by the team have usually been incorporated into the system.

Everybody benefits

The ACT is very effective for Computer Aided Decisions; as much as 90% of its business comes through this program, Roginski estimates.

The ACT's value goes beyond convenient space for demonstration. Well-equipped, privately owned and operated demonstration rooms are cropping up in major technology market centers. But, Roginski says, that sort of arrangement does not compare to the ACT, which is "upscale in terms of equipment and designed to make a client feel at home."

Both Computer Aided Decisions and DEC benefit from the ACT. While the former receives sales and hardware support that it would not otherwise have, DEC can walk customers past its full line of CPUs and peripherals. Manny Barreto, DEC's New York ACT manager, says, "Customers often come in looking for something specific, and they see other new things that they'd also like." •

Radding is a Boston-based author specializing in business and technology.

Successful tryout no guarantee of hit

If Ira Powell doesn't end up buying Computer Aided Decisions, Inc.'s investment management software package and accompanying Digital Equipment Corp. hardware, it won't be because of any problem with the Application Centers for Technology (ACT) program.

When Powell, operations manager of the Pension Fund Investment Department at Du Pont Co., describes his experience at the ACT, he interrupts himself repeatedly to apologize for sounding like a DEC commercial and to remind the listener that he has not actually bought anything through the ACT yet.

"Maybe it's just a honeymoon phase. Or perhaps we were just lucky," he says.

Early last year, Powell began searching for an investment portfolio management system for his department. The Pension Fund Investment Department is a fully staffed, in-house investment management operation that manages Du Pont's $10.5 billion pension fund.

> "WE ASKED them to show us how we would do this or do that, and they did it."
>
> IRA POWELL
> DU PONT CO.

The department wanted an existing program that would be broad enough and flexible enough to handle its large investment operation, including overseas investments, foreign currency transactions and a host of domestic and international financial activities.

The company did not want either custom-written software or a commercial package that would require extensive retooling to fit the particular needs of an in-house investment operation.

Since the activities of his department are far afield from Du Pont's usual areas of business, Powell requested hardware and software recommendations from a number of major computer manufacturers. Only DEC responded with comprehensive recommendations, complete with a demonstration. The quality of the company's response was due to the ACT program, which was created to answer this type of request.

Powell says he had expected to travel throughout the country to see the recommended products. As it turned out, however, his DEC sales representative invited him to suburban Philadelphia, about an hour from Du Pont's Wilmington, Del., headquarters, to meet Computer Aided Decisions' employees and have a full, working demonstration of that company's program.

At the ACT, both Powell and systems supervisor Sam Park were given a full hands-on demonstration by DEC and Computer Aided Decisions personnel. "We asked them to show us how we would do this or do that, and they did it," Powell says.

A good team

What would ultimately be the strongest impression the ACT made on Powell was the seamlessness with which DEC was able to incorporate third-party vendors into the ACT presentation. Powell says he is confident he was presented with a unified hardware and software solution, which is what the ACT was ideally intended to achieve. The DEC ACT team, as a single entity, assumed responsibility for the complete solution. "Everyone was involved. It's like they went that extra step to be involved," he says.

Powell was also impressed with the attentive treatment he and Park received. "They were acting like we were buying the entire product line," he says.

Powell has not yet signed a purchase agreement, but his project leader is booked for a trip to Computer Aided Decisions' headquarters in Boston for training and a chance to meet the staff.

While Powell is clearly impressed with the DEC ACT and the enthusiasm, knowledge and service he encountered there, his decision will ultimately depend on the quality of the products he is offered.

"There are lots of people who have very good packages, but they are too focused," he says. These packages fulfill only some of his needs. The Computer Aided Decisions program, although it does much more of what he wants and does it well, still does not do everything.

There is no doubt that seeing a software product in the context of an ACT operation adds to its appeal, Powell says, but even an impressive demonstration of teamwork in action is not, by itself, necessarily enough to clinch the sale. •

VAX attracts

FROM PAGE S3

users purchased their word processing software from DEC.

There is some question of whether that measure of success will continue as the market for DEC equipment expands into new user territory and PC software companies begin to bring their products into the VAX environment.

The Sierra Group's Gruhn says PC software firms could act as spoilers for DEC's in-house development efforts.

"The first choice for word processing tends to be the PC," she says, "which means that users are more likely to use a word processing program that is moved up to the VAX from the PC."

The upper hand

At the same time, if DEC does beef up its own library of applications, as it has indicated it will, the company is likely to claim an advantage that third-party software houses are lacking. All of the DEC applications built so far were designed to run in tandem with each other.

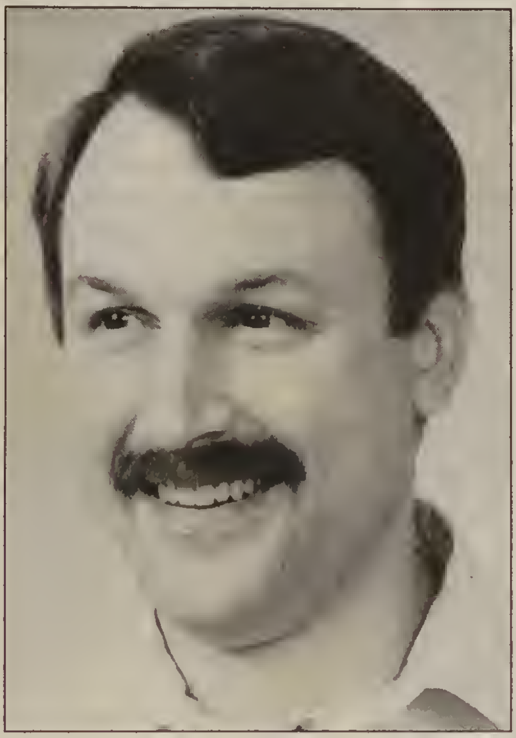
Whitey Stange, VAX technical manager at Pioneer Data Systems, a division of Pioneer Hi-Bred International, Inc. in Johnston, Iowa, also wants third-party packages to work together in some way.

Pioneer Data's Stange

"Every vendor seems to think it is in the center of the universe," he says. "These programs just don't seem to know each other."

However, according to Stange, there is another side to the dilemma. With DEC's All-In-1 program, users sacrifice individual expertise, evident in third-party offerings, for the ability to have an integrated team in which no component stands out, he says.

"Precision Visuals, for instance, does an outstanding job with graphics, and other third-party-house packages provide the best in their field," Stange says, referring to the Boulder, Colo.-based developer of graphics software and provider of consulting services. "DEC's All-In-1 is not the best in any of its individual parts."



> "WE TEND to run some experiments with a package and then move on to the next one."
>
> ROBERT LOVESTEDT
> WEYERHAEUSER CO.

In a recent Sierra Group study, a common interchange for multiple-vendor software was chosen as one of the top five demands of users.

Forecasters say the pressure will be sufficient to force DEC to develop what has been called X-Windows, much like the Windows program developed by Microsoft Corp.

In Microsoft's Windows, multiple applications from multiple vendors can be run at the same time.

However, Weyerhaeuser's Lovestedt says that, like with everything else, need determines whether or not his company buys applications from DEC or a third party. "We're totally neutral," he says. "We have a data base from DEC and other packages from third parties."

Jeppesen Sanderson's Knaus says DEC has the upper hand in any head-to-head competition between itself and its third-party software house. "Presumably, DEC would be able to keep up with VMS revisions," he says. "Hopefully, they would know VMS better than anyone."

Even DEC itself, especially with its CMP, looks to third parties for many of its in-house applications, according to DEC's Corley. But that does not prevent the company from building its own beachheads within the applications market.

A precedent on the hardware side strikes fear in the hearts of some third-party software developers. Many years ago, when DEC concentrated on making CPUs, it purchased most of its peripherals from third parties. Outside manufacturers flourished for a long time by providing disk drives, tape drives and printers to DEC. During the past decade, however, DEC has learned that there is gold in the peripherals business.

"It is an interesting game," The Sierra Group's Gruhn says. "It is not just limited to DEC. It begins when a manufacturer is dependent on third parties to supply a need. Once the market becomes large and thriving, the manufacturer goes from a supporting role to a predatory one. The long-term reality is that once a market grows to about $10 billion, or large enough to be considered relevant by the manufacturer, natural instincts take over."

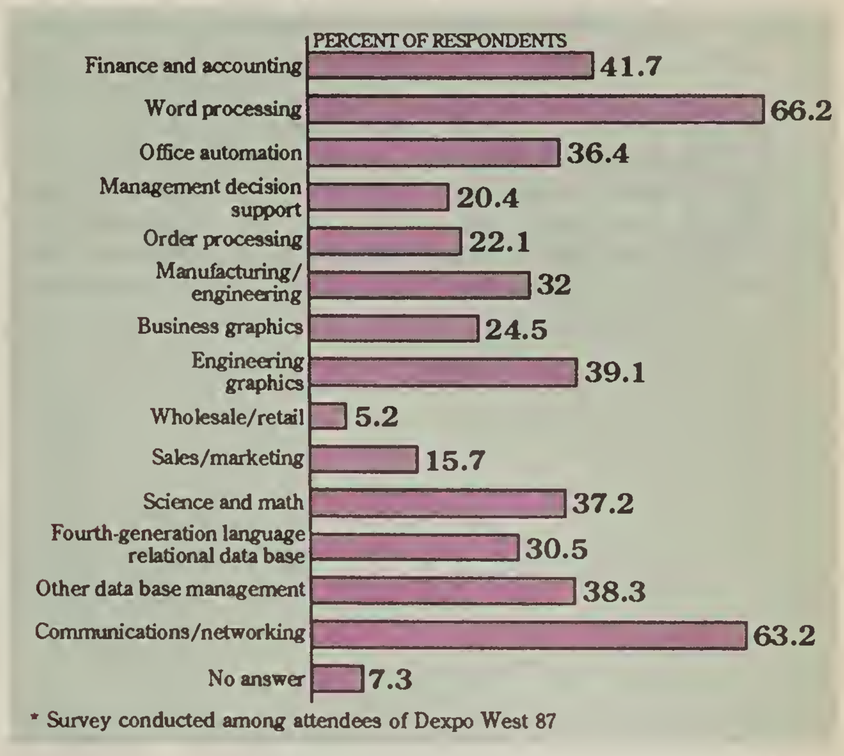
The question then is not whether but when DEC will take on the application software market, Gruhn says.

No worries

DEC officials say the third-party market will remain a healthy competitor and will continue to complement its own efforts. Third-party software houses do not openly express any major concerns.

Software preferences

*Breakdown of applications in use on DEC systems**



* Survey conducted among attendees of Dexpo West 87

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CW CHART

"All we do is software," says Peter Hallett, a product manager at Precision Visuals, Inc. "For DEC, software plays only a small part in its overall operations."

MCBA's Freeman agrees. "Independents can react so much quicker to the marketplace than a giant corporation like DEC," he says.

Users naturally want to see a continuation of healthy competition between DEC and third-party houses and will probably use their influence to keep the third-party channels open.

Teradyne's Loomer notes that DEC's closed architecture on the VAXBI bus has not exactly shut down third-party peripheral houses. "They've just gotten very creative," he says.

Furthermore, while, DEC's in-house word processing application may have won acceptance by many VAX users, some see this horizontal effort as too little, too late.

Several years ago, Stange says, his division, which does genetic research to develop corn hybrids for the international seed company, asked DEC if it planned to develop its own word processor. He was assured that the company would not.

A year later, Stange says, DEC developed its All-In-1 word processing package. "We had already put a package in place," he says, "and there was no chance of our converting to something else then." •

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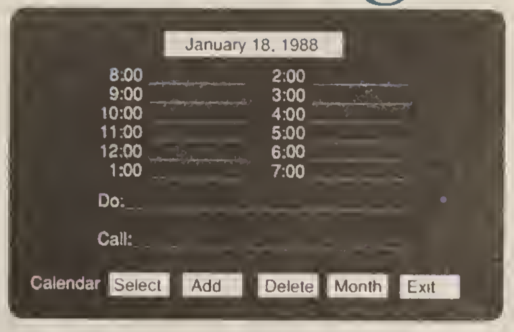

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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

What will M&D's Millennium do for me on the VAX that the company's G/L Plus series does not?

Stanley Ciepcielinski
Alcatel NA, Inc.
Hickory, N.C.

MCCORMACK & DODGE CORP.: Millennium is a set of programs that provide shared features between applications such as general ledger, accounts payable and fixed assets. Examples include Borderless Query, which gives users on-line access to data stored in any M&D application, and Screen Designer, which allows users to display screen data any way they choose.

We want to move DEC RDB files on a VAX to a VAX 8600 running Focus. Is there any simple way to do this without having to break the files down to flat files and then reload them again to Focus?

Terry Bazylewicz
Director of MIS
Jersey City State College
Jersey City, N.J.

INFORMATION BUILDERS, INC.: Focus can interface directly to RDB data bases, allowing users to easily read RDB data directly into a Focus data base with no intermediate step. Focus supports the same interface functionality with most VAX-based data, such as RMS, Relational Technology, Inc.'s Ingres, Oracle Corp.'s Oracle and Sybase, Inc.'s Sybase.

It would be nice to be able to use DEC's CMS with Ingres. However, ABF, Ingres's fourth-generation language, is not compatible with CMS. What is Relational Technology doing to provide a code management facility that would allow this?

Tom Blythe
American Mathematical Society
Providence, R.I.

RELATIONAL TECHNOLOGY, INC.: Relational Technology does not now provide a direct interface between CMS and Ingres. However, the data dictionary available in the current version of Ingres contains catalogs that allow users to write utilities for a CMS/Ingres interface.

We have files created with DEC's Datatrieve that use a PIC definition of S9(4). Trying to read that format using SAS is very difficult, and we have to go through a character conversion routine in order to get the SAS program to read the format. Is there an easier way to read a Datatrieve format using SAS?

Peter Byron
Process automation staff
Great Northern Paper Co.
Millinocket, Maine

SAS INSTITUTE, INC.: Generating a standard ASCII file using PIC S9(4), the data file should contain a standard ASCII string with a leading-sign five numeric values to the left of the decimal and four to the right. If this is the case, using the w.d informat will allow SAS to read the data.

Why did Cincom decide to implement Vaxcluster support within Ultra by using an I/O server rather than a homogeneous use of the distributed lock manager?

Dave Sinclair
Business manager
Nucleus Data Systems
Calgary, Alta., Canada

CINCOM SYSTEMS, INC.: Both approaches have their advantages and disadvantages.

The disadvantages of homogeneous support show up most clearly when used in a data base management environment. In a high-volume transaction-based system, the sheer number of locks required to ensure data integrity can be enormous; consequently, the management of these locks becomes a prime

Continued on next page

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Developers rate compatibility as DEC's greatest virtue

BY KATY GURLEY

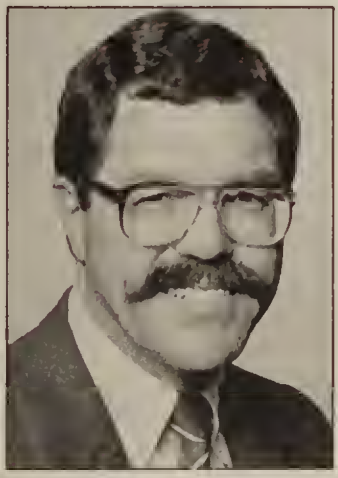
Digital Equipment Corp. is hot, and its uncompromising micro-to-mainframe compatibility is why, third-party software developers agree.

"Our software runs on everything from the Microvax 2000 all the way up to the clustered 8800s," says David Sohm, vice-president of marketing and new business development at Ask Computer Systems, Inc. in Los Altos, Calif., which produces Manman and Maxcim, integrated management information systems for manufacturing.

Sohm says IBM cannot provide such widespread compatibility. "If you try to take the same range of computing power from IBM, you would have to start with the System/36 or 38 range and move all the way up to the 3090. There is not a single operating system that runs on all those systems," he says.

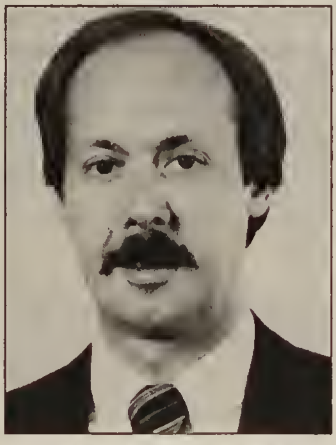
Running the gamut

R. Patrick Johnson, vice-president of new product development as well as the System 1022 data base management system at Compuserve Data Technologies, Inc. in Cambridge, Mass., says his company's System 1032 DBMS is successful because it is linked to DEC's VMS architecture.


David Sohm

"The VAX is really the only architecture that can run the exact same software on a range of machines covering a thousandfold price range," he says.

This high degree of compatibility fits the business climate of the 1980s, which is another reason DEC is riding high, according to Howard Anderson, managing director of The Yankee Group, a Boston-based research firm. That climate, he says, is characterized by departmental computing, decentralized operations, profit centers and less reliance on or need for a major data processing department.


Dennis Martineau

"What they've done in the last two years is either outrageous genius or good luck," Anderson says. "DEC began to fit best into those companies with decentralized management and profit centers — a company in which you have a vision that, from the smallest device on the software, could grow with you. Plus, they offer great connectivity. DEC is an awfully attractive company to write for right now."

The attraction was strong enough to pull Project Software & Development, Inc., a project management software firm also located in Cambridge, out of an exclusively IBM orbit. "Three out of every four licenses we sell are for the VAX," says Dennis Martineau, vice-president of marketing. "In 1978, we were selling 100% IBM. But now we are moving strongly into the DEC environment."

Developers have watched DEC bulldoze its way into the heart of the minicomputer market during the past two years. It accomplished this not only by offering across-the-board compatibility but also through what developers say is a good-faith effort to provide them with technical information about a product in advance of its release.

Sohm says access to upcoming technology is a key support issue. "We need continuing access to their software development plans, particularly in the tools area. We're writing software today that is going to be delivered a year or two from now. If we are writing that software with today's tools, it won't have all the features it should have."

In addition, DEC is minimizing head-on competition between its own sales force and those of developers.

This way to support

A key element in improving support, developers say, has been DEC's Cooperative Marketing Program (CMP) and System Cooperative Marketing Program (SCMP), under which DEC's outside sales force and its third-party developers team up to sell new accounts for vertical applications. The 110 CMP members sell only software; the more than 40 SCMP members are former DEC OEMs that sell hardware as well.

"Support has been improving by leaps and bounds in the last two years," says Sohm, who attributes the improvement to the CMP project and whose own company is an SCMP.

Participants, nonparticipants and DEC itself all agree that a company receives more attention and better software support from DEC if it is a member of CMP or SCMP.

"DEC has told its third-party suppliers in the CMP and SCMP groups where it is going. It wants to keep them happy," says The Yankee Group's Anderson. "It's in their best interest to see that those guys survive."

The software companies most attractive to DEC are those producing vertical-market packages in the scientific/engineering, manufacturing, financial services, government, health care and other large service industries.

Software developers who do not fit the CMP or SCMP profiles sometimes feel shortchanged. "When you're not a CMP, it's more difficult to get answers," Johnson says. Access Technology, Inc. in Needham, Mass., recently integrated its principal product, 20/20, with DEC's All-In-1. Now the company needs extra support from DEC, but it does not receive it because it is not a CMP member.

Jay Yesselman

"From a marketing standpoint, we've been somewhat frustrated that DEC's marketing emphasis has been in the way of vertical solutions," says Jay Yesselman, product manager for 20/20, a spreadsheet with graphics, data base management and project modeling. But he says the firm works in cooperation with DEC's direct sales force and that the association alone has boosted the product's credibility.

George Luntz, vice-president of sales and marketing for MCBA, a producer of accounting, distribution and manufacturing software, says he would like a CMP agreement with DEC but has not yet been approved for one.

"The key component of such an agreement would be the stamp of approval of DEC," he says. "We have everything but a written agreement in place." The Glendale, Calif., company participates in DEC's Small Business Direct Program, but the CMP membership would provide it with more advance information on upcoming DEC products.

And justice for all

A DEC spokesman acknowledges that CMP and SCMP participants get more attention from DEC but that the company actively supports all third-party developers.

In fact, DEC has maintained a data base of software products called The Softbase System since 1986. This data base is available on DEC's worldwide network to employees in sales marketing and purchasing. More than 1,500 third-party developers currently have software products listed among the 6,500 entries, and DEC actively encourages participation. A toll-free number is available for anyone interested in making submissions. Products can be listed for any type of DEC hardware and need not be based on DEC's operating system. •

Gurley is a free-lance writer based in Wellesley, Mass.

Ask vendor

FROM PRECEDING PAGE

cause of system overhead.

With a server method of Vaxcluster data base support, Ultra can be fully supportive of a Vaxcluster environment; that is, it can provide a high degree of load balancing and fall-over support while not incurring the overhead of VMS lock management.

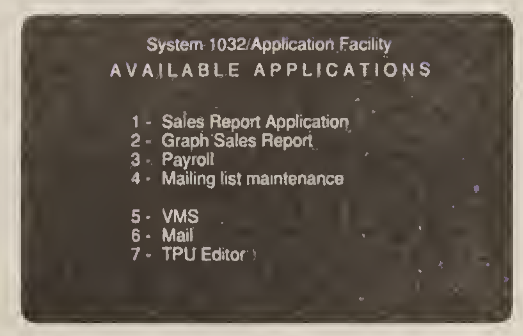
Does Microsystems Engineering plan to upgrade the VAX version of Mass-11 to give it "what-you-see-is what-you-get" [WYSIWYG] qualities, both batch and interactively, and typesetting capabilities, like kerning and graphics cropping? When do you see it happening?

Cecilia Fernandez
Technical documentation system manager
Racal-Milgo, Inc.
Sunrise, Fla.

MICROSYSTEMS ENGINEERING CORP.: Release 8A of Mass-11 for the VAX and micros will be available this spring. The VAX version will be as WYSIWYG as the hardware will allow.

It will also include some sort of graphics designation in review mode — either an actual graph or a representative box. Which designation is used depends on whether our users indicate they are willing to put up with the slow performance time created when drawing a graph to terminal on the VAX.

In addition, Mass-11 will print to an Adobe Systems, Inc. Postscript file, which will put in printer codes, allowing the file to go out to a Linotype typesetter. •



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4 - Mailing list maintenance

5 - VMS
6 - Mail
7 - TPU Editor

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Microvax DBMSs

COMPANY	PRODUCT	STRUCTURAL APPROACH	MINIMUM MEMORY REQUIRED (IN BYTES)	MULTIUSER CAPABILITIES	MENU-DRIVEN	INCLUDES QUERY LANGUAGE	PROGRAMMING LANGUAGE SUPPORTED	FULL DATA TRANSFER TO OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM FIELDS PER RECORD	MAXIMUM RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Advanced Data Management, Inc. **(609) 799-4600**	DRS	Hypertext	500K	Yes	Yes	Yes	C, Fortran, Basic, Pascal, proprietary	No	4,000	255	100M	At data base, record, field, command levels	$7,200-$50,000
Ashton-Tate Corp. **(213) 329-8000**	Dbase III Plus/Lanpac	Relational	640K	Optional	Yes	Yes	Dbase	WKS, DIF, ASCII files	1,024	128	1G	Eight levels of passwords, data encryption, form-access controls	$695-$995
Automated Systems, Inc. **(605) 335-3636**	Easy Base II	Relational, hierarchical	64K	Yes	Yes	Yes	No	Any package	30	108	Limited by disk space	Password protection through file level	$2,995
Boeing Computer Services **(206) 865-3660**	Boeing Rim	Relational	500K	Yes	No	Yes	Cobol, Fortran, Pascal, Basic, PL/I	No	4,096	1,021	Limited by disk space	Relation level	$6,000 and up
Campus America, Inc. **(615) 523-9506**	Poise DMS-Plus	Relational	2M	Yes	Yes	Yes	Basic	ASCII files	255	512	16.7M	Passwords at menu, screen, field levels	$19,500
Canalta, a division of Associated Grocers Ltd. **(403) 236-6100**	Lazer	Network	1M	Yes	Yes	Yes	Cobol, Basic, C	Proprietary	Limited by disk space	Limited by disk space	1G	Record locking, secondary and primary password protection	$3,480
Cincom Systems, Inc. **(800) 543-3010**	Ultra	Relational	1M	Yes	Yes	Yes	Cobol, Basic, Fortran, proprietary	No	4,000	512	Limited by disk space	Passwords	$20,000
Cognos Corp. **(613) 738-1440**	Powerhouse PC	Indexed	640K	No	No	Yes	Proprietary	1-2-3, Dbase, DIF, ASCII files	2,047	1,024	Limited by disk space	None	NP
Compuserve Data Technologies, Inc. **(617) 661-9440**	System 1032 4GL/DBMS	Relational	3,500	Yes	Yes	Yes	C, Cobol, Fortran, Basic	SAS, SPSS, Decgraph, Control-32	32,767	3,000+	Limited by disk space	Password user ID code, user name, any combination field-, record-level restrictions	$3,000-$19,500
Computer Representatives, Inc. **(408) 980-9898**	Relate/DB	Relational	Varies	Yes	No	Yes	Proprietary, Cobol, Pascal, Fortran, Ada	Any ASCII files or native DBMSs	NP	126	Limited by disk space	Password protection at the file, field, record levels	$15,000
DB/Access, Inc. **(408) 255-2920**	Enhansys	Relational	1M	Yes	Yes	Yes	Cobol, Fortran, PL/I, assembler	Access/ Star	130	300	Limited by disk space	None	$10,000
Dialogue, Inc. **(212) 425-2665**	Analect/Rim	Relational	1M	Yes	No	Yes	Fortran, C	Oracle, R:Base 5000 formatted files	4,095	1,000	Limited by disk space	Relation level	Starts at $4,000
Digital Equipment Corp. **(800) DIGITAL**	VAX RDB/VMS	Relational	4M	Yes	Yes	Yes	NP	Cullinet IDMS/R, VSAM	16,383	2,000	NP	Access control lists, VMS security	$1,900-$59,000
	VAX DBMS	Network (Codasyl-compliant)	4M (4M per processor for 8974/8978)	Yes NP	No	Yes		No	65,000	Varies by processor	NP	VMS security	$2,900-$90,000
Empress Software, Inc. **(416) 922-1743**	Empress	Relational	2M	Yes	Yes	Yes	C, Fortran, Cobol	ASCII files	Limited by disk space	Limited by disk space	Limited by disk space	At table level	$9,000
HN Corp. **(612) 893-1848**	CYX	Network	1M	Yes	No	No	All standard Unix	No	8,192 bytes	NP	16M +	None	$15,000
Henco Software, Inc. **(617) 890-8670**	Info-DB+	Relational	1M	Yes	Yes	Yes	Any supported by VAX	Works with host file formats	4,096	9,999	Limited by disk space	Through data item level	$4,500-$15,000
Information Builders, Inc. **(212)736-4433**	Focus for VAX	Relational	512K	Yes	Yes	Yes	Cobol, Fortran, Pascal, C, SQL	PC Focus, IBM mainframe Focus	256	Limited by disk space	Limited by disk space	Access, resource security; program accounting; password assigning; display control; encryption	$6,800
Information Dimensions, Inc. **(800) DATA MGT**	Basis	Flat	512K	Yes	No	Yes	C, Pascal, Fortran, Cobol, PL/I, Basic, Ada	All-in-1	1M	2,000	More than 1G	For data base, index postings, files, data elements	NP
	DM	Relational	1M	Yes NP	No	Yes		No	15,000	500	2G	Privacy codes, access codes	NP
Informix Software, Inc. **(415) 322-4100**	Informix-4GL, SQL, ESQL/C, C-Isam	Relational	1M	Yes	Yes	Yes	C	1-2-3	32,000	32,000	Limited by disk space	Full SQL GRANT, REVOKE facilities	$960-$90,000
Inmagic, Inc. **(617) 661-8124**	Inmagic	Flat/ inverted	NA	Yes	Yes	Yes	Fortran	ASCII files	Limited by disk space	75 (unlimited repeating fields)	Limited by disk space	Passwords by field, function levels	$3,850

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	STRUCTURAL APPROACH	MINIMUM MEMORY REQUIRED (IN BYTES)	MULTIUSER CAPABILITIES	MENU-DRIVEN	INCLUDES QUERY LANGUAGE	PROGRAMMING LANGUAGE SUPPORTED	FULL DATA TRANSFER TO OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM FIELDS PER RECORD	MAXIMUM RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Intelligent Information Systems, Inc. **(212) 966-4468**	IIS/Destiny	Relational, hierarchical, network	1M	Yes	Yes	Yes	Proprietary	RMS files	64,000	Limited by disk space	Limited by disk space	Data base, file, record locking	$3,600 (four users), up to $40,000 (65+ users)
Interactive Systems, Inc. **(800) 962-UDMS**	User Defined Management System	Relational, hierarchical	1M	Yes	Yes	Yes	C, Cobol, Fortran, Basic, Pascal	DIF, ASCII files	Limited by disk space	User-definable	Limited by disk space	Through field level	$2,950-$5,500
Interactive Technology, Inc. **(800) 362-6203**	RDM	Relational	512K	Yes	Yes	Yes	Pascal, C, Fortran	Any RMS or ASCII files	255	220	16M +	Password protection from menu through individual field levels	$5,990
Interbase Software Corp. **(617) 649-3977**	Interbase	Relational	1M	Yes	Yes	Yes	Ada, Basic, Cobol, C, Fortran, Pascal, PL/I	RMS, RDB files	32,000 bytes	16,000	Limited by disk space	Data base, relation, field levels	$5,000-$15,000
Landmark Software Systems, Inc. **(201) 722-5100**	X-ample	Relational	256K	Yes	Yes	Yes	Cobol	RMS files	132	Limited by disk space	Limited by disk space	For fields, entities, data base	$20,000-$60,000
MDBS, Inc. **(800) 344-5832**	MDBS III	Network	64K	Yes	No	Optional	Cobol, C, Fortran, Pascal, Basic, proprietary	NP	65,535	65,535	Limited by disk space	Password protection at record, transaction, data item levels	Starts at $7,000
	Knowledgeman/2	Relational	512K	Yes NP	Yes	Yes		NP	65,535	255	2G +	Data encryption, write/read access codes	$3,995
National Information Systems, Inc. **(408) 985-7100**	Accent	Hierarchical, network, relational	1M	Yes	No	Yes	Any VAX standard language	RMS, ASCII files	30,000	12,000	Limited by disk space	None	NP
Odesta Corp. **(312) 498-5615**	Helix VMX	Relational	NP	Yes	Yes	Yes	NP	NP	NP	Limited by disk space	Limited by disk space	Password protection	$4,500 and up
Oracle Corp. **(800) 345-DBMS**	Oracle	Relational	1M	Yes	Yes	Yes	NP	IBM DB2, SQL/DS	65,000 bytes	254	Limited by disk space	NP	$3,000 and up
Park Software, Inc. **(206) 343-0447**	Xentis	RMS files	NP	Yes	Yes	No	No	1-2-3, Multiplan, Excel, Nyplan, Finar, Digicalc	128	250	Limited by disk space	Up to nine levels	$1,000-$4,500
Progress Software Corp. **(617) 275-4500**	Progress	Relational	2M	Yes	Yes	Yes	Proprietary	Dbase	2,000	2,000	Limited by disk space	User ID, password at field, file levels	$3,000-$12,000
P-Stat, Inc. **(609) 924-9100**	P-Stat	Relational	400K	Yes	Yes	Yes	Proprietary	ASCII files	999	3,000	Limited by disk space	None	Approx. $2,000
Public Office Corp. **(202) 638-5999**	Session	Three-dimensional	NP	Yes	Yes	No	No	ASCII files	100 per level	137	1M +	Access per user, account, data base, program, record, data item, field	$12,500
Quodata Corp. **(203) 728-6777**	QDMS-R	Relational	5M	Yes	Yes	Yes	All VAX programming languages	Proprietary	512	32,000	32G	Read/write protection at field level, security at individual terminals	$16,000-$25,000
Relational Technology, Inc. **(800) 4 INGRES**	Ingres	Relational	1M	Yes	Yes	Yes	C, Cobol, Fortran, Basic, Pascal, Ada, PL/I	SYLK, DIF, ASCII files	2,000	127	Limited by disk space	Field, time, data, user levels	$5,000
Rim Technology, Inc. **(206) 451-8144**	Rtirim	Relational	500K	Yes	No	Yes	Fortran, Pascal, C	ASCII files	4,000	100	Limited by disk space	Record locking, passwords	$4,000
Ruf Corp. **(913) 782-8544**	Imprs	Relational	2M	Yes	Yes	Yes	RMS files, Basic, Fortran	ASCII, RMS files	4,000 bytes	200	Limited by disk space	Passwords, encryption at programming level	$20,000
Saturn Systems, Inc. **(612) 944-2452**	Saturn-base	Proprietary	NA	Yes	Yes	Yes	Proprietary	ASCII files	132	10,000	999,999	Passwords at field, record levels	$3,500
Seed Software Corp. **(703) 960-8800**	Deed DBMS, Proseed	Network	1M	Yes	No	Yes	Cobol, Fortran, C	1-2-3, ASCII, DIF files	32,767	3,000 per schema	Limited by disk space	Passwords	$3,550-$11,840
Signal Technology, Inc. **(800) 235-5787**	Smartstar	Relational	NA	Yes	Yes	Yes	NP	RMS, RDB files, Britton Lee IDM	132	NP	Limited by disk space	None	$5,000-$55,000
Smith, Abbott and Co. **(301) 561-8411**	Autopro	Relational	NA	Yes	Yes	Yes	Any that works with RMS files	RMS files	80	500	Limited by disk space	At menu, option, field levels	$1,750-$8,000
3CI, Inc. **(800) 525-2001**	Infocer	Relational	1M	Yes	Yes	Yes	NP	RMS files	70	Limited by disk space	Limited by disk space	Data base, data set, data item levels	$4,900-$20,000
Timeline, Inc. **(206) 822-3140**	Digibase	Hierarchical	512K	Yes	Yes	Yes	Basic	RMS files	32,767	512	4G +	Passwords	$4,000
Watcom Products, Inc. **(519) 886-3700**	Watfile/Plus	Flat, relational	50-60K	No	No	Yes	Any that can access RMS sequential text files	RMS files	79	Limited by disk space	2G	None	$900-$1,800 per year annual license

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George J. Weiss
Program Director
November 20, 1987

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VAX and PDP DBMSs

COMPANY	PRODUCT	DEC HARDWARE SUPPORTED	STRUCTURAL APPROACH	QUERY LANGUAGES USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Advanced Data Management, Inc. **(609) 799-4600**	DRS	VAX/VMS	Hypertext	QML	Yes	Field	Yes	Monitor performance, analyze structure, rebuild, recovery	No	NP	Up to $72,000
Automated Systems, Inc. **(605) 335-3636**	Easy Base II	All VAX, PDP-11	Relational, hierarchical	Proprietary	Yes	NP	Yes	Report writer, library, backup, recovery, reorganization utilities	Yes	Any	$1,995-$4,995
Boeing Computer Services **(206) 865-3660**	Boeing Rim	VAX/VMS	Relational	Proprietary	Yes	Relation	Yes	Report writer, forms screen generator, program interface language	Yes	NA	Up to $25,000
Campus America, Inc. **(615) 523-9506**	Poise DMS-Plus	All	Relational	Proprietary	Yes	Limited field level	Yes	Screen, report, forms generator; data manipulation; tape, interfacing utilities; menu processor	Yes	ASCII files	$22,000-$25,000
Canalta, a division of Associated Grocers Ltd. **(403) 236-6100**	Lazer	All VAX	Network	Proprietary	Yes	Secondary through keyboard	Yes	Defines schemas, adds/deletes records, password verification	No	Total	$3,480-$18,950
Cincom Systems, Inc. **(800) 543-3010**	Ultra	All VAX	Relational	Spectra	Yes	Record	Yes	Complete DBMS maintenance and tuning utilities	No	RMS files	$20,000-$120,000
Compuserve Data Technologies, Inc. **(617) 661-9440**	System 1022 DBMS	Any running TOPS 10, 20	Inverted	Proprietary	Yes	Record, field	No	Installation manual, system administrator program with DBA, INFO, BANNER, PATCH, FIX, CHECK, DEFAULT commands	Yes	NP	$22,500-$72,000
	System 1022 4GL/DBMS	All VAX	Relational	Proprietary Yes	Yes	Field		NA	Yes	NP	$12,000-$156,000
Computer Representatives, Inc. **(408) 980-9898**	Relate/DB	All VAX	Relational	Proprietary	Yes	File, field, record	No	Has command necessary to observe or alter structure of any given table	Yes	Any ASCII files or native DBMSs	$15,000-$110,000
Cognos Corp. **(613) 738-1440**	Powerhouse	All VAX	Relational, flat, hierarchical	Proprietary	Yes	Item	Yes	File maintenance	No	RDB/VMS, RMS files	$5,000-$85,000
Cosmic/The University of Georgia **(404) 542-3265**	Rim5	All VAX	Relational	Proprietary	No	NA	Yes	None	No	R:Base, Microrim	$3,000 for program
DB/Access, Inc. **(408) 255-2920**	Enhansys	All VAX	Relational	Proprietary	No	NA	Yes	File descripter, program linkage descripter	Yes	Readers IB2, SQL/DS, Focus, Datatrieve, RDB	$25,000-$49,000
Dialogue, Inc. **(212) 425-2665**	Analect/Rim	VAX/VMS	Relational	Proprietary	No	Relation	Yes	Report writer/generator, data loader, 4GL support language, color graphics, statistical modeling, data manipulation	Yes	Oracle, R:Base 5000 formatted files	Up to $80,000
Empress Software, Inc. **(416) 922-1743**	Empress	All VAX	Relational	SQL	Yes	Table	Yes	Report writer, 4GL, archiving, distribution control	Yes	ASCII files	Up to $10,000
HN Corp. **(612) 893-1848**	CYX	PDP-11, all VAX	Network	None	Yes	None	No	Recovery, dumping/loading, expansion utilities; file maintenance; transaction roll-back	No	None	$10,000-$30,000
Henco Software, Inc. **(617) 890-8670**	Info-DB+	All VAX running under VMS	Relational	Proprietary	Yes	Data item	Yes	Security at data item level	No	RMS files	$20,000-$165,000
Information Builders, Inc. **(212) 736-4433**	Focus for VAX	VAX/VMS	Relational	SQL, Focus, EQL, proprietary	Yes	Value within field	Optional	Access command control, encryption, password assignment, display control, program accounting, resource limitation	Yes	Oracle, Ingres, Sybase, DBMS, RMS, RDB, Focus	$6,800-$88,500
Information Dimensions, Inc. **(800) DATA MGT**	Basis	VAX/VMS	Flat	Proprietary	Yes	Field	No	Maintenance	No	Sequential files	NP
	DM	VAX/VMS	Relational	Proprietary Yes	Yes	Data item		Maintenance	No	ASCII files	NP
Information Structures, Inc. **(303) 293-2911**	Base/OE	PDP-11, all VAX	Relational, hierarchical	Proprietary	Yes	File	Yes	File update processor; query, application languages	Yes	None	$13,500-$36,000
Informix Software, Inc. **(415) 322-4100**	Informix 4GL, SQL, ESQL, C-Isam	All VAX	Relational	SQL	Yes	Record, field	Yes	Dbload, bcheck, upscol, mkmessage, dbschema	No	NP	$960-$90,000
Inmagic, Inc. **(617) 661-8124**	Inmagic	All VAX	Flat	Proprietary	No	Field, function	No	Help facilities, security, editors, report writer	Yes	ASCII files	$13,500
Intelligent Information Systems, Inc. **(212) 966-4468**	IIS/Destiny	VAX/VMS	Network, relational, hierarchical	Proprietary	Yes	File, record, data base	Yes	Field/key array, variable length fields, on-line recovery, symbolic debugger, file transfer from RMS files, automatic translation, add views	No	RMS files	$3,600 (four users), up to $40,000 (65+ users)
Interactive Systems, Inc. **(800) 962-UDMS**	User Defined Management System	All VAX running VMS	Relational, hierarchical	Proprietary	Yes	Field	Yes	Dump, dictionary extract, dictionary interface programs	Yes	System 1032, Ingres, RMS files	$2,950-$15,300

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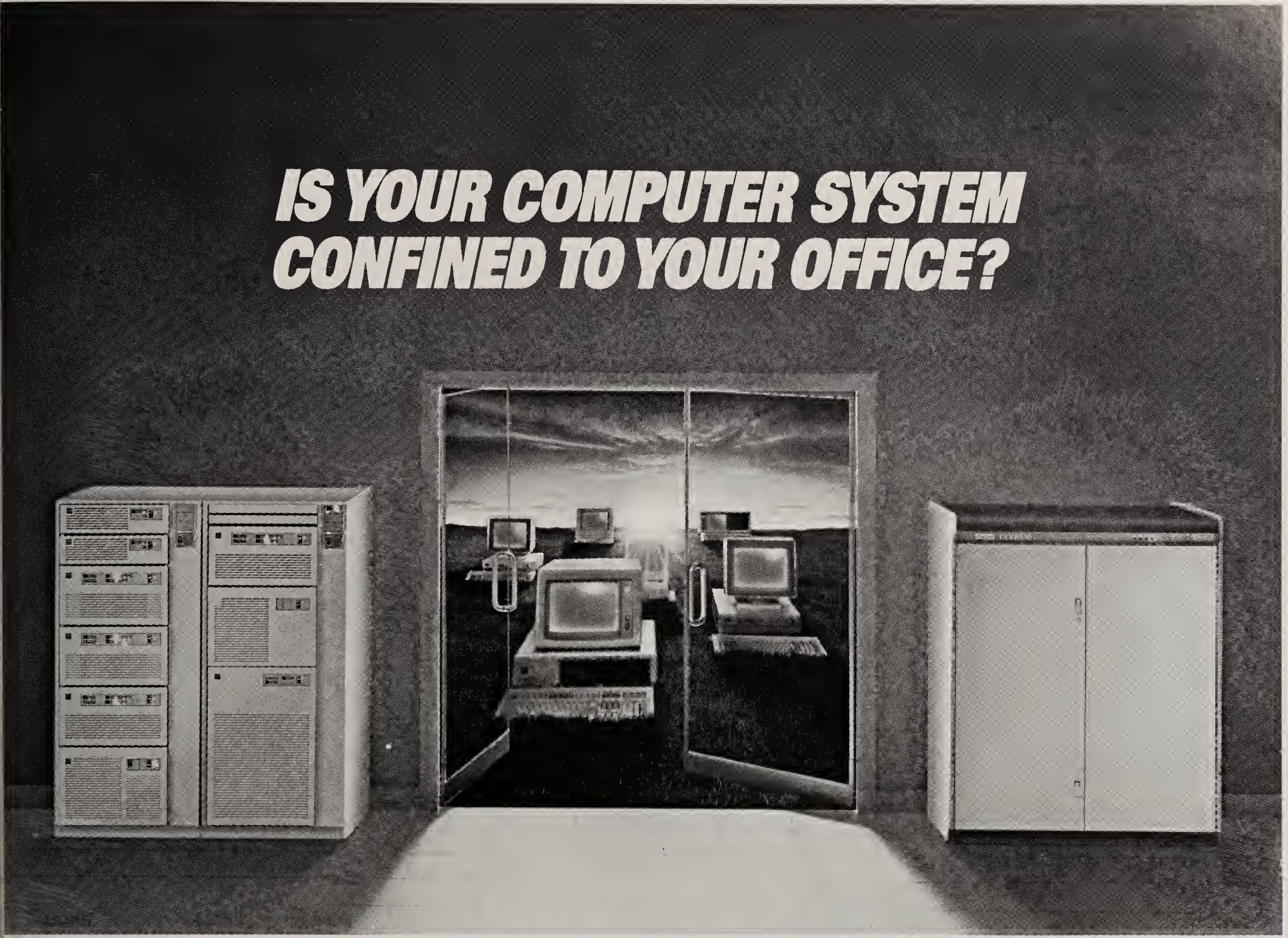
COMPANY	PRODUCT	DEC HARDWARE SUPPORTED	STRUCTURAL APPROACH	QUERY LANGUAGES USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFER WITH WHICH DBMSs	PRICE
Interactive Technology, Inc. **(800) 362-6203**	RDM	All VAX, PDP-11s; Pro 350, Pro 380	Relational	Query by form	Yes	Field	Yes	Files, forms, processes, reports, menus, full-system management	Yes	Any RMS or ASCII files	$2,995-$24,500
Interbase Software Corp. **(617) 649-3977**	Interbase	All VAX up to Vaxcluster	Relational	SQL, proprietary	Yes	Data base, relation, field	Yes	Backup, restore, maintenance utilities	Yes	RDB, proprietary	$35,000-$75,000
Landmark Software Systems, Inc. **(201) 722-5100**	X-ample	All VAX	Relational	Proprietary	Yes	NP	Yes	Backup and recover	Yes	All running on VAX	$20,000-$60,000
MDBS, Inc. **(800) 344-5832**	Knowledgman/2	VAX-11, 8000 series	Network	Proprietary	Yes	Field	Yes	NP	Yes	NP	$15,900 and up
	Knowledgman/2	VAX-11, 8000 series	Relational	Proprietary	No	Field	Yes	NP	Yes	NP	$11,995 and up
National Information Systems, Inc. **(408) 985-7100**	Accent	VAX 10, 20	Relational, network, hierarchical	English-like	Yes	VMS	Yes	NP	No	RMS files	NP
Odesta Corp. **(312) 498-5615**	Helix VMS	Any VAX	Relational	Proprietary	NP	NP	NP	NP	Yes	NP	$4,500-$75,000
Oracle Corp. **(800) 345-DBMS**	Oracle	All VAX running VMS, Ultrix	Relational	SQL	Yes	Table, row	Yes	Load/unload, index consistency, user matrix, performance indicators, resource usage	Yes	DB2, SQL/DS	$3,000-$108,000
Park Software, Inc. **(206) 343-0447**	Xentis	VAX/VMS	RMS	None	NP	Nine levels	Yes	Creates data files, audit trail management, loading/dumping file description, copy file description, mass change/delete	Yes	RMS files	$2,000-$13,000
P-Stat, Inc. **(609) 924-9100**	P-Stat	All VAX running VMS, Unix	Relational	Relational	Yes	NA	No	Report writer, look-up feature, join, separate, sort and update of files	No	ASCII files	$4,000-$8,000
Progress Software Corp. **(617) 275-4500**	Progress	VAX running VMS, Ultrix	Relational	Proprietary	Yes	Record	Yes	Backup/restore analysis	Yes	Dbase	$20,000-$60,000
Public Office Corp. **(202) 638-5999**	Session	All VAX	Three-dimensional	None	Yes	Record, data, field	Yes	Reads magnetic tape; report generator; changes fields; creates, modifies data bases	Yes	ASCII files	$25,000 and up
Quodata Corp. **(203) 728-6777**	QDMS-R	All VAX/VMS	Relational	Proprietary	Yes	Bit	Yes	Screen, report, letter, menu generation	Yes	ASCII, EBCDIC files	$16,000-$25,000
	QDMS	PDP-11, RSTS/E family	Relational	None	Yes	Bit	Partial	NP	Yes	ASCII, EBCDIC files	$12,000-$19,500
Relational Technology, Inc. **(800) 4 INGRES**	Ingres	VAX/VMS, Ultrix	Relational	SQL, QUEL	Yes	Field, time, data, user	Yes	Cojournaling/recovery/audit facilities, query cost, query plans, controllable maximum cost query allowable, user-controllable concurrency-control mechanisms	Yes	DB2, SQL/VS, RDB, IMS, RMS, Dbase II, Lotus 1-2-3	$5,000-$160,000
Rim Technology, Inc. **(206) 451-8144**	Rtirim	VAX running VMS, Unix	Relational	Proprietary	Yes	Record	Yes	Report writer, full-screen interface	Yes	ASCII files	$8,000
Ruf Corp. **(913) 782-8544**	Imprs	All VAX	Relational	Proprietary	Yes	Program	Yes	Report writer, report generator, data manipulation, data extraction	Yes	ASCII files	$5,000-$10,000
Saturn Systems, Inc. **(612) 944-2452**	Saturn-base	All PDP,VAX	Proprietary	Proprietary	Yes	Field, record	No	Report writer, report generator, load/unload, data base extension, screen parameter files, interactive query	Yes	ASCII files	$3,500-$14,000
Seed Software Corp. **(703) 960-8800**	Seed DBMS, Proseed	All VAX/VMS	Network	Proprietary	Yes	Data item	No	Failure recovery, usage statics, page dump, search/repair broken pointers, file initialization	Yes	None	$4,740-$78,950
Signal Technology, Inc. **(800) 235-5787**	Smartstar	All VAX	Relational	SQL	Yes	NA	Yes	NP	No	RMS, RDB files, Britton Lee IDM	$5,000-$55,000
Smith, Abbott and Co. **(301) 561-8411**	Autopro	All VAX	Relational	Query by form	Yes	Menu, field	Yes	Report writer, form generation, menu generator, word processing	Yes	RMS files	Up to $20,000
Software AG of North America, Inc. **(703) 860-5050**	Adabas	All VAX	Relational	Proprietary	Yes	Field	Yes	Initial design and loading, restart/recovery, data base modification, audit/control/tuning, security	No	Proprietary	$10,000-$80,000
Sybase, Inc. **(415) 548-4500**	Sybase System	All VAX	Relational	SQL	Yes	Table, column, view	Yes	Bulk copying, log recovery, journaling, table generation, data base monitoring, resource control, maintenance tools, consistency checker	Yes	File	$15,000-$150,000
3CI, Inc. **(800) 525-2001**	Infocen	All VAX	Relational	Proprietary	Yes	Data item	Yes	Performance monitor, import, load/off-load, build, change, security	Yes	RMS files	$4,900-$69,000
Timeline, Inc. **(206) 822-3140**	Digibase	All VAX, PDP-11	Hierarchical	Proprietary	Yes	NP	Yes	Data dictionary, documentation, select/report generator, data inquiry, forms generator, screen generator	No	RMS compatible programs	$4,000-$9,000
Watcom Products, Inc. **(519) 886-3700**	Watfile/Plus	VAX/VMS	Flat, relational	Proprietary	No	NP	No	NP	No	None	$900-$1,800



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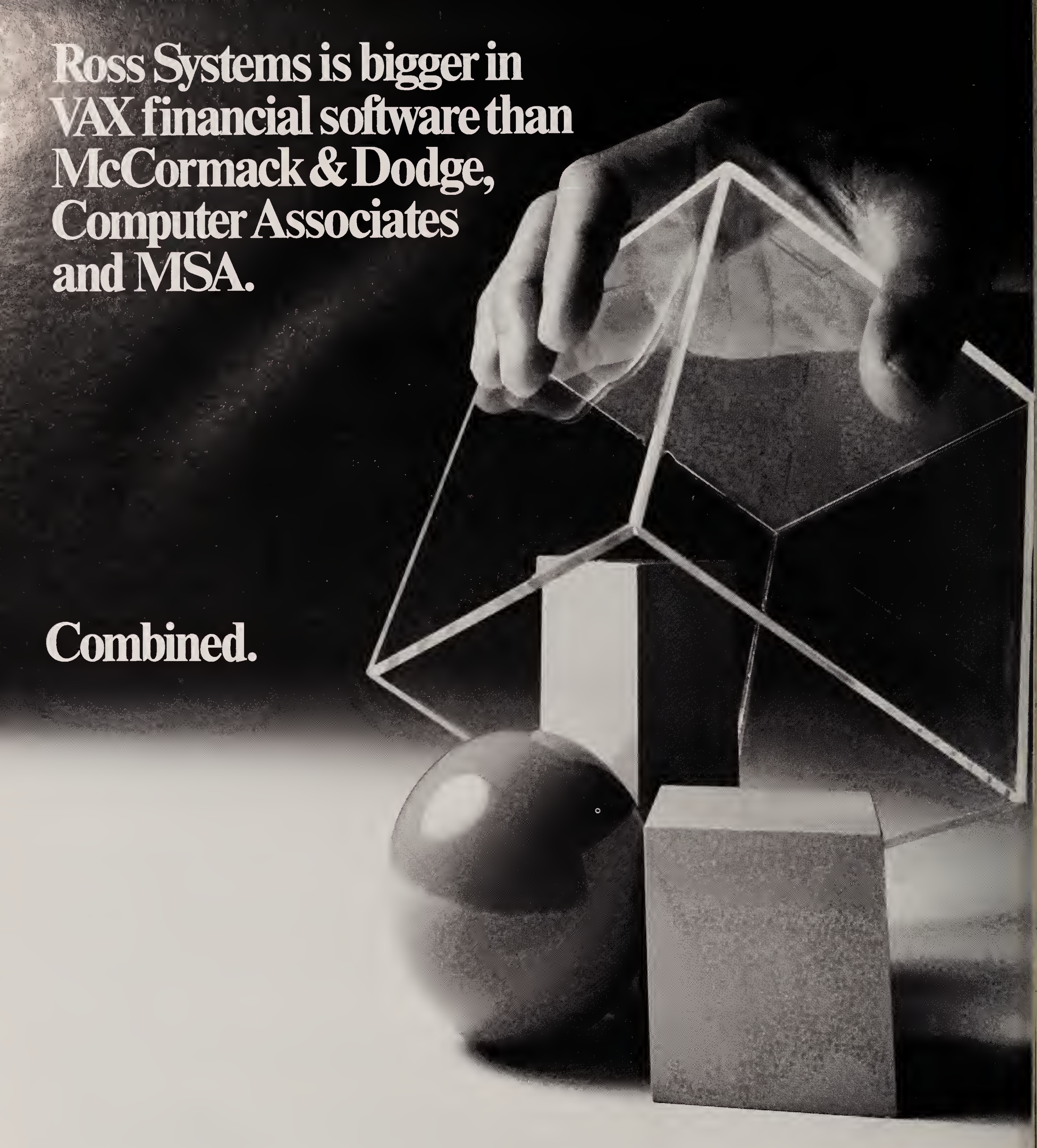

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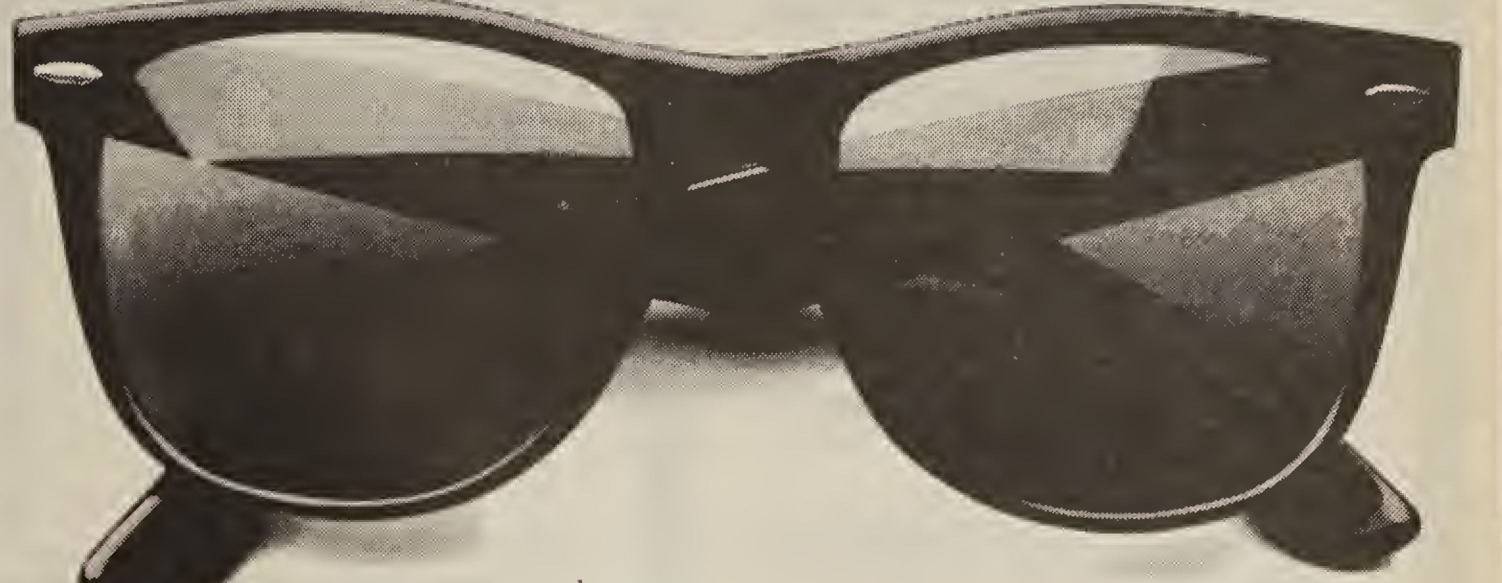

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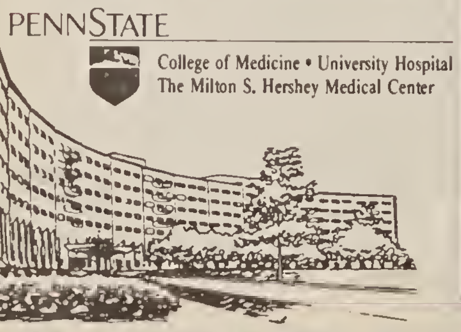

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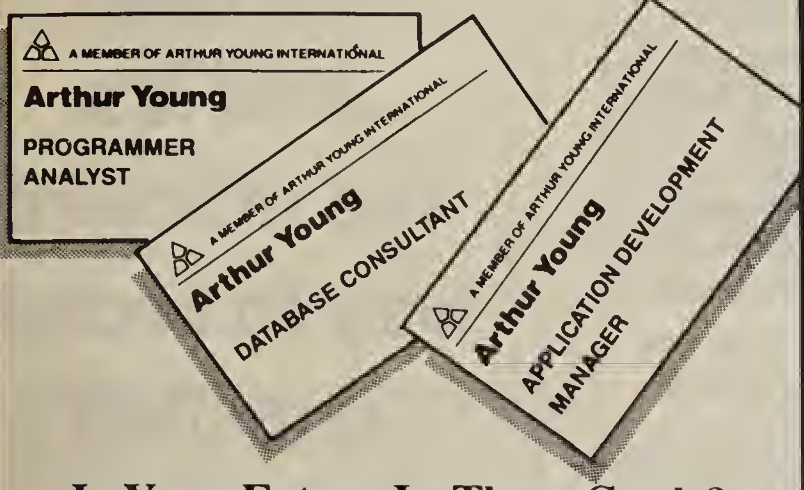
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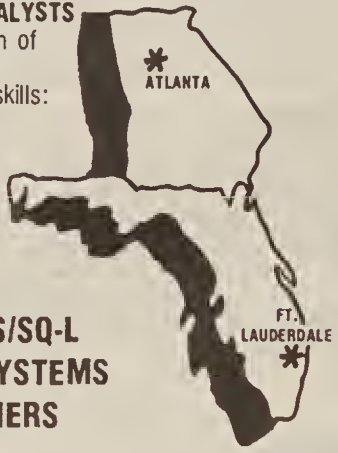

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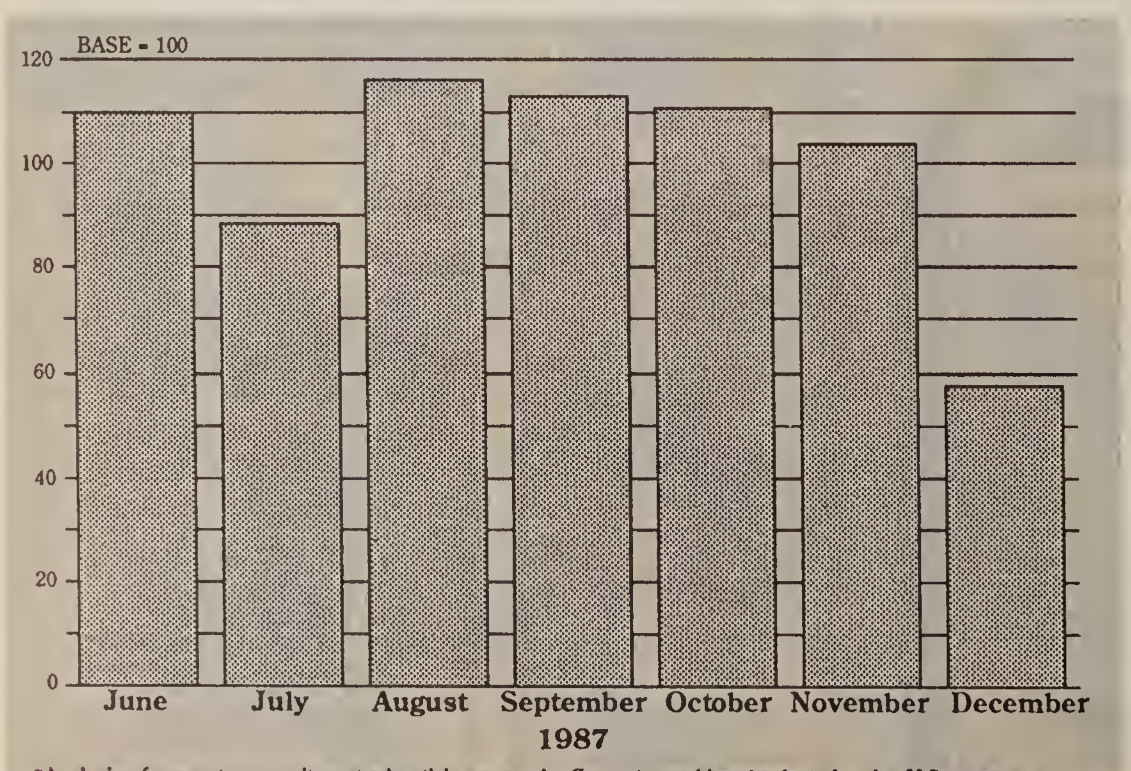

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MARKETPLACE

IBM plagued by short supply

Prices, demand on their way up as used market can't find enough PCs

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The used microcomputer market was active the week of Jan. 25, as all the IBM Personal Computer, PC XT and PC AT models were in short supply and hot demand.

The once plentiful PC Model 076 experienced a dramatic increase in demand. At week's end, the 256K-byte standard model closed up, at $775. The PC XT Models 086 and 089 were available in single units, but quantity buyers were left out in the cold with cash in hand. The Models 086 and 089 closed up, at $1,350 and $1,700, respectively.

The big news on IBM's Intel Corp. 80286-based equipment came straight from the horse's mouth this week, as a reliable source at IBM said there are no excess-inventory AT Model 339 units in the marketplace. He added, "I could have sold a ton of them [339s]. We are still manufacturing those units, and they are available through dealers."

Despite that comment, resellers continue to search, sell and resell quantities of 339s. Like the Holy Grail, these knights of the marketplace are searching the vapor in hopes of finding a lot of machines.

Compaq market alive

Compaq Computer Corp. trading experienced an increase in activity.

The classic Portable I closed even at $725 as single-unit transactions between end users dominated the board. The Portable II closed up marginally, at $1,725, experiencing similar conditions. In contrast, the Portable III climbed up to $2,725 as the market saw high demand and tight supply.

Compaq's Deskpro 286 performed well, as single-unit activity led the 20M-byte model to close up, at $2,250. The Deskpro 386 held even at $4,375, representing the only Compaq model that experienced a decrease in trading volume. Supply conditions for this powerful machine continue to be tight.

Slow week for Apple

Apple Computer, Inc. Macintosh trading was relatively quiet for the week ended Jan. 29. The Macintosh 512 traded even at $850. The Mac 512E closed even as well, at $975 in single units. The Mac Plus stumbled and closed down, at $1,275, as supply conditions improved for buyers. The Mac SE closed down slightly, at $1,900, as discount steet prices continued to push down this machine's used value. Mac II models continue to be in high demand on the used market, with few sellers. This week, the Mac II closed at $4,025, with buyers outnumbering sellers by at least 9-to-1.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Jan. 29, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$775	$900	$350
XT Model 086	$1,350	$1,425	$800
XT Model 089	$1,700	$1,900	$1,000
AT Model 099	$2,300	$2,900	$1,950
AT Model 339	$3,375	$3,500	$2,400
Compaq Portable I	$725	$975	$600
Portable II	$1,725	$1,900	$1,475
Portable III	$2,725	$3,000	$2,175
Plus	$1,300	$1,300	$975
Deskpro 286	$2,250	$2,500	$2,050
Deskpro 386	$4,375	$4,600	$4,000
Macintosh 512	$850	$875	$650
512E	$975	$1,100	$800
Plus	$1,275	$1,375	$950
SE	$1,900	$2,150	$1,700
II	$4,025	$4,200	$3,500

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

European market experiences a flurry of activity in January

Selected European IBM equipment

Current fair retail market value in Europe

Disk drives	Date shipped	List price in U.S. dollars*	Percent of market value
3370 A2/A12	2Q 1984	$54,757	15
3370 B2/B12	2Q 1984	$36,509	17
3375 A1	3Q 1981	$57,651	4
3375 B1	3Q 1981	$40,604	7
3380 AA4	4Q 1981	$142,444	18
3380 B4	4Q 1981	$103,432	25
3380 AD4	1Q 1985	$121,947	51
3380 BD4	1Q 1985	$88,556	54
3380 AE4	3Q 1985	$164,793	55
3380 BE4	3Q 1985	$135,059	60
Processors			
4381 P1	4Q 1983	$639,497	16
4381 P3	2Q 1985	$657,062	49
4381 P12	2Q 1986	$421,201	60
4381 P14	2Q 1986	$845,041	53
System/38 Model 4	3Q 1980	$55,870	25
System/38 Model 6	1Q 1984	$93,118	41
System/38 Model 20	4Q 1984	$193,396	45
System/38 Model 600	3Q 1986	$271,556	65
System/38 Model 700	3Q 1986	$392,935	75

* Based on Feb. 2, 1988, exchange rate

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.

BY ALYSON PRIOR
and JOHN DESOUZA
IDC FINANCIAL SERVICES CORP.

Secondary market activity throughout Europe was fairly brisk on a wide range of IBM equipment during the traditionally slow month of January.

A number of factors contributed to this activity, with the most prevalent being users' anticipation of upcoming IBM announcements and the announcements' effect on MIS acquisitions.

The European fair retail market values (see chart, left) were established early this month.

Disk drives

In general, there are plenty of IBM 3370 and 3375 disk drives available on the used market, even though activity is more indicative of a spot market. Demand for this equipment fluctuates, causing a periodic drying up of supply when prices have shown marked, but short-lived, increases.

As expected, users have shown more interest in the B drives of all IBM disk drive models lately.

The market for 3380 standards and 3380 AD4s and BD4s is steady; values for the AE4s and BE4s have been falling, however. The market for standards is fluid, and values are stable at this time.

The market for 3380 D models has been showing some degree of short supply, which is helping to keep values at current levels up.

Currently, indications from the market are that 3380 AE4 and BE4 values will continue to drift downward in the immediate future.

After the initial excitement of IBM's new 3380 AJ4, BJ4, AK4 and BK4 drives, it appears that displacement of the older drives is not as rapid as some had expected.

For the most part, large users seem to have moved to the new drives. Medium-size shops, however, appear to be hanging onto their standard and D drives for now.

4381 processors

The withdrawal of the upgrades to the 4381 Models 1, 2 and 3 late last year and the arrival of the upgrades to 4381 Models 21, 22, 23 and 24 in January appears to have been well-assimilated by the market from the first.

The steadfastness that had been seen in values for the Model 14 has disappeared, and prices are falling. In addition, Model 1s are declining in value, particularly since the withdrawal of the early-model upgrades.

There are very few Model 1, 2 and 3s around and, coupled with little demand, the upgrade capability becomes somewhat less attractive cost-wise for these machines than for certain other models.

In contrast, 4381 Model 2s, 12s and 13s are garnering a healthy demand because of the attractiveness of the upgrade to the Models 21, 22, 23 and 24. In addition, values are firm for these models. These boxes are somewhat scarce and typically are snapped up very quickly.

System/38

The System/38 market has maintained a good level of activity during recent weeks despite the approach of IBM's Silverlake, which appears to be having more of an effect on the System/36 market right now. Silverlake is slated to be IBM's System/36 and 38 follow-on machine.

Demand for the smaller, older boxes — in particular, the System/38 Models 4, 6 and 8 — continues, with supply tightening and values remaining the same.

Obtaining upgrades to the System/38 Model 100 series is relatively problem-free, whether one goes to IBM or a third-party source. The resulting high-end boxes, System/38 Models 600 or 700, are appearing on the market at attractive price levels.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

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Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
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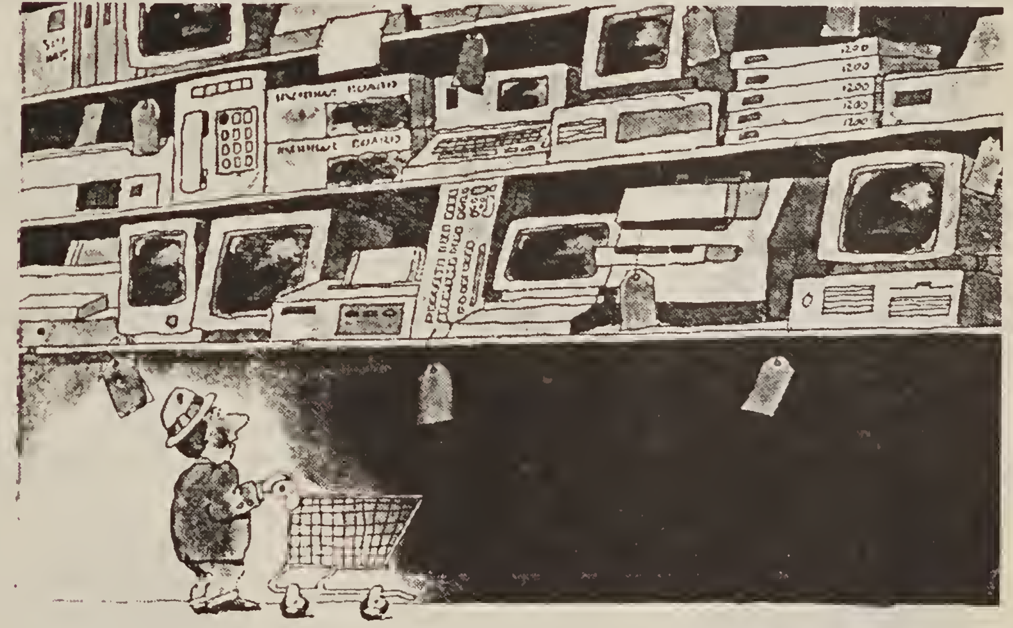

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Issue Date	Topic	Ad Closing Date
Feb. 29	Performance Management/ Capacity Planning	Feb. 12
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

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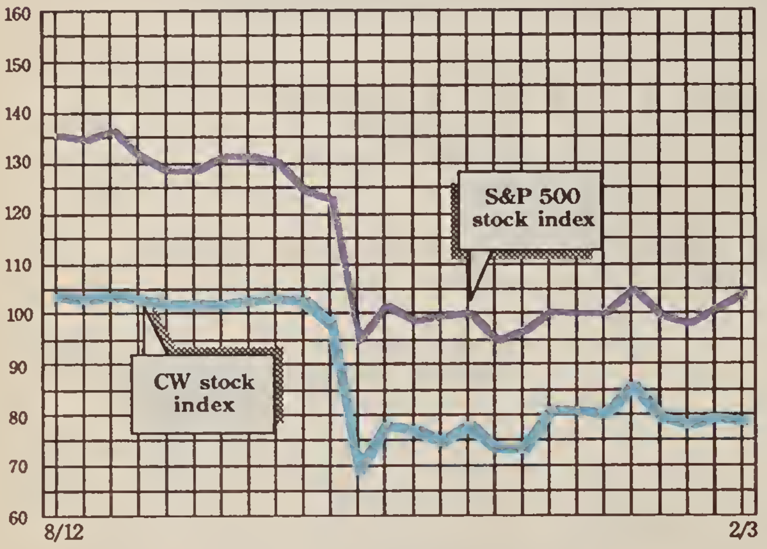
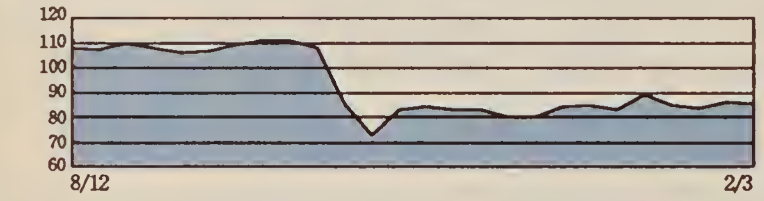
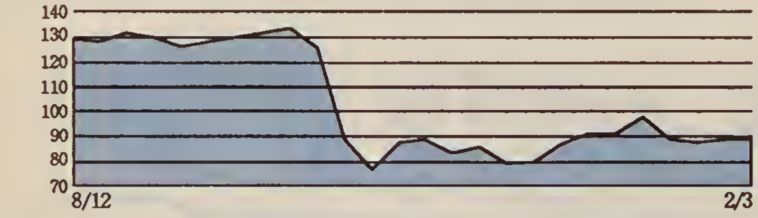


Indexes	*Last Week*	*This Week*
Communications	86.4	**85.6**
Computer Systems	89.1	**88.7**
Software & DP Services	92.3	**92.5**
Semiconductors	55.1	**53.1**
Peripherals & Subsystems	81.6	**80.0**
Leasing Companies	102.1	**101.6**
Composite Index	79.9	**78.9**
S&P 500 Index	101.7	**104.3**

Communications



Computer Systems



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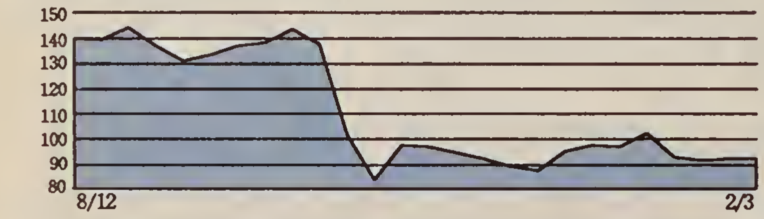

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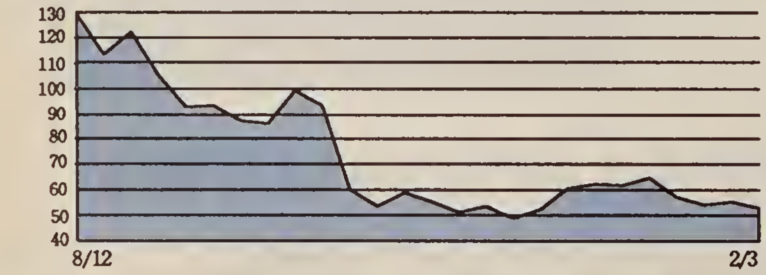

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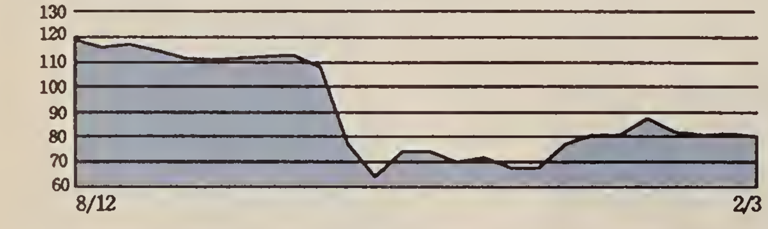
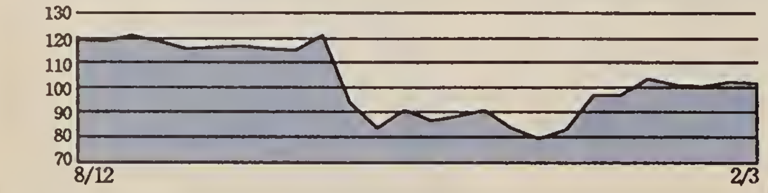


Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 3, 1988

Communications and Network Services

E X C H		PRICE				
		52-WEEK RANGE (1)		CLOSE FEB. 3 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	100	74	92.6	+1.1	1.2
Q	ANDREW CORP	19	11	13.5	+0.3	1.9
Q	ARTEL COMM CORP	5	2	1.5	-0.1	-7.7
N	AT&T	36	20	29.5	+0.6	2.2
Q	AVANT GARDE COMP INC	6	2	1.9	-0.1	-6.3
Q	AVANTEK INC	19	6	7.0	+0.3	3.7
N	AYDIN CORP	38	16	20.5	+0.3	1.2
N	8ELL ATLANTIC CORP	80	61	71.9	+1.8	2.5
N	BELLSOUTH CORP	44	29	40.9	+1.1	2.8
Q	COMPRESSION LA8S INC	8	2	4.0	+0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.8	-0.2	-9.7
O	CONTEL CORP	40	25	34.0	+1.0	3.0
Q	DATA SWITCH CORP	9	4	5.8	-0.5	-8.0
Q	DIGITAL COMM ASSOC	49	20	26.1	+0.1	0.5
Q	DYNATECH CORP	44	14	19.0	+0.8	4.1
Q	FIBRONICS INTERNATIONAL INC	11	2	2.4	-0.1	-5.0
Q	GANOALF TECHNOLOGIES	11	5	5.8	-0.1	-2.1
Q	GENERAL OATACOMM INDS	14	3	3.6	-0.3	-6.5
N	GTE CORP	45	29	38.6	+1.9	5.1
Q	INFOTRON SYS CORP	12	5	6.8	-0.5	-6.9
N	ITT CORP	66	42	46.0	+0.9	1.9
N	M A COM INC	16	7	9.6	-0.4	-3.8
Q	MCI COMMUNICATIONS CORP	12	5	11.0	+0.4	3.5
Q	MICOM SYS INC	18	7	10.0	-1.0	-9.1
Q	NETWORK SYS CORP	19	7	7.5	+0.1	1.7
N	NORTHERN TELECOM LTD	24	14	17.B	-0.3	-1.4
Q	NOVELL INC	30	12	17.8	-5.0	-22.0
N	NYNEX CORP	78	58	69.8	+2.0	3.0
N	PACIFIC TELESIS GROUP	34	9	29.1	+0.9	3.1
N	PARAOYNE CORP	9	4	4.3	+0.4	9.7
A	PENRIL CORP	6	1	3.4	+0.1	3.8
N	PLESSEY PLC	41	23	27.6	+1.3	4.7
N	SCIENTIFIC ATLANTA INC	20	8	12.4	+0.3	2.1
N	SOUTHWESTERN BELL CORP	46	22	37.4	+0.8	2.0
Q	3 COM CORP	26	12	17.3	-1.6	-8.6
N	TIMEPLEX INC	41	17	32.3	+0.0	0.0
Q	UNGERMANN 8ASS INC	16	5	7.4	-0.8	-9.2
N	U S WEST INC	60	43	54.1	+1.3	2.4

Computer Systems

Q	ALLIANT COMPUTER SYS	37	5	7.8	+0.5	6.9
Q	ALPHA MICROSYSTEMS	6	3	4.1	-0.3	-5.7
Q	ALTOS COMPUTER SYS	17	9	11.0	+0.4	3.5
A	AMDAHL CORP	50	19	30.0	-0.3	-0.8
Q	APOLLO COMPUTER INC	25	9	12.3	-1.3	-9.3
Q	APPLE COMPUTER INC	60	26	39.5	-0.3	-0.6
N	BOLT BERANEK & NEWMAN	30	12	14.5	-0.5	-3.3
Q	BRITTON LEE INC	5	1	1.5	+0.0	0.0
N	COMPAQ COMPUTER CORP	79	26	43.6	-2.6	-5.7
Q	COMPUTER AUTOMATION INC	17	5	10.3	-0.4	-3.5
A	COMPUTER CONSOLES INC	12	2	4.9	-0.3	-4.9
Q	CONCURRENT COMP CORP	24	11	16.8	+0.6	3.9
N	CONTROL DATA CORP DEL	38	18	21.8	+0.6	3.0
Q	CONVERGENT TECH	12	3	3.1	+0.0	0.0
Q	CONVEX COMPUTER CORP	22	6	7.6	-0.4	-4.7
N	CRAY RESH INC	136	47	68.6	+1.3	1.9
Q	DAISY SYS CORP	13	5	7.0	-0.3	-3.4
N	OATA GEN CORP	39	16	25.9	+0.1	0.5
N	DATAPOINT CORP	9	3	4.4	-0.1	-2.8
N	OIGITAL EQUIP CORP	200	110	116.0	-7.0	-5.7
N	FLOATING POINT SYS INC	17	3	4.0	+0.1	3.2
N	GOULD INC	34	8	10.9	+0.1	1.2
N	HARRIS CORP	43	22	26.9	+0.4	1.4
N	HEWLETT PACKARD CO	74	36	53.1	-2.0	-3.6
N	HONEYWELL INC	91	49	61.0	+2.0	3.4
N	I8M	176	102	109.0	-3.8	-3.3
Q	INFORMATION INTL INC	17	9	11.9	+1.1	10.5
Q	IPL SYS INC	3	1	1.5	-0.1	-7.7
Q	MASS COMPUTER CORP	14	5	5.4	+0.0	0.0
N	MATSUSHITA ELEC INOL LTD	196	93	172.0	-1.5	-0.9
Q	MEGADATA CORP	7	3	3.1	-0.2	-5.7
Q	MENTOR GRAPHICS CORP	39	14	20.0	+0.3	1.3
N	NBI INC	14	4	4.0	+0.1	3.2
N	NCR CORP	87	50	56.5	+1.3	2.3
N	PRIME COMPUTER INC	31	12	15.9	+0.0	0.0
Q	PYRAMIO TECHNOLOGY	12	5	8.3	+0.0	0.0
Q	STRATUS COMPUTER	41	15	21.8	+0.5	2.4
Q	SUN MICROSYSTEM INC	46	14	29.8	-1.8	-5.6
Q	SYM8OLICS INC	6	1	1.6	+0.1	4.0
N	TANOEM COMPUTERS INC	38	17	18.8	+1.0	5.6
N	TANDY CORP	57	28	35.5	+2.1	6.4
N	ULTIMATE CORP	37	16	16.0	+0.1	0.8
N	UNISYS CORP	48	24	31.4	-1.8	-5.3
A	WANG LA8S INC	19	10	13.9	+0.0	0.0

Software & DP Services

Q	AOVANCEO COMP TECH	6	1	1.9	+0.0	0.0
N	AGS COMPUTERS INC	30	11	13.6	-0.8	-5.2
Q	AMERICAN MGMT SYS INC	20	9	13.5	-1.3	-8.5
Q	AMERICAN SOFTWARE INC	22	6	10.1	+0.1	1.3
N	ANACOMP INC	11	4	7.0	+0.1	1.8
Q	ANALYSTS INTL CORP	10	4	7.4	-0.1	-1.7
Q	ASHTON TATE	33	13	23.0	-0.5	-2.1
Q	ASK COMPUTER SYS INC	17	6	10.1	+0.4	3.8
Q	AUTOOESK INC	34	12	17.0	-1.3	-6.8
N	AUTO OATA PROCESSING	55	16	41.0	-0.8	-1.8
Q	8OOLE & BA8BAGE INC	12	5	8.3	+1.0	13.8
N	COMPUTER ASSOC INTL INC	37	15	28.0	+0.3	0.9
Q	COMPUTER HORIZONS CORP	15	7	9.4	-0.3	-3.2
N	COMPUTER SCIENCES CORP	73	42	47.0	+1.3	2.7
N	COMPUTER TASK GROUP INC	18	9	9.9	-0.3	-2.5
Q	COMSHARE INC	28	12	14.5	-0.8	-4.9
N	CULLINET SOFTWARE INC	14	4	6.3	+0.5	8.7
Q	CYCARE SYS INC	10	6	7.9	+0.6	8.6
Q	DUQUESNE SYS INC	33	10	18.1	-1.6	-8.2
A	DATA ARCHITECTS INC	17	7	9.4	+0.5	5.6
N	GENERAL MTRS (CLS E)	51	30	36.8	-1.1	-3.0
Q	HOGAN SYS INC	17	5	4.6	-0.1	-2.6
Q	INFORMIX CORP	31	11	20.0	-0.9	-4.2
Q	INTELLICORP INC	11	2	2.9	+0.0	0.0
Q	KEANE INC	10	6	7.0	+0.0	0.0
Q	LOTUS OEV CORP	40	19	26.3	+0.0	0.0
Q	MANAGEMENT SCI AMER	21	6	5.8	-0.3	-4.2
Q	MICRO PRO INTL CORP	8	3	3.4	+0.1	1.9
Q	MICROSOFT CORP	79	33	52.B	-3.0	-5.4
Q	MORINO ASSOCIATES INC	24	7	14.4	+0.1	0.9
Q	NATIONAL OATA CORP	34	19	26.0	+0.3	1.0
Q	ON LINE SOFTWARE INTL INC	22	9	9.8	-0.1	-1.3
Q	ORACLE SYS CORP	19	7	12.3	-1.0	-7.5
N	PANSOPHIC SYS INC	28	11	14.8	+0.8	5.4
Q	POLICY MGMT SYS CORP	30	15	20.8	+1.8	9.2
Q	PROGRAMMING & SYS INC	14	7	10.1	+0.1	1.3
Q	REYNOLDS & REYNOLOS CO	39	14	18.0	+1.0	5.9
Q	SEI CORP	18	10	15.0	-0.3	-1.6
Q	SHAREO MEO SYS CORP	53	19	25.4	+0.8	3.0
Q	SOFTWARE AG SYSTEMS INC	19	7	7.8	+0.0	0.0
Q	SOFTWARE PUBG CORP	17	5	8.6	-0.8	-8.0
A	STERLING SOFTWARE INC	14	6	8.3	+0.0	0.0
Q	SUNGARO DATA SYS INC	21	10	15.3	+1.0	7.0
Q	SYSTEMATICS INC	30	19	27.0	+1.8	6.9
N	SYS. SOFT INC.	24	7	12.3	-0.4	-3.0
Q	VM SOFTWARE INC	45	7	8.3	+0.5	6.5

Semiconductors

N	ADV MICRO OEVICES INC	25	8	9.5	+0.1	1.3
N	ANALOG OEVICES INC	24	8	10.8	-0.9	-7.5
Q	ANALOGIC CORP	13	5	7.3	+0.0	0.0
Q	INTEL CORP	42	18	23.5	-0.5	-2.1
Q	LSI LOGIC CORP	17	7	7.8	-1.0	-11.4
N	MOTOROLA INC	74	35	40.1	-0.6	-1.5
N	NATL SEMICONOUCTOR	22	10	10.0	-0.1	-1.2
N	TEXAS INSTRS INC	80	36	43.0	-1.1	-2.5
A	WESTERN OIGITAL CORP	33	11	11.3	-0.6	-5.3

Peripherals

Q	ALLOY COMP.	13	4	4.1	-0.125	-2.9
N	AM INTL INC	9	3	4.1	-1.4	-25.0
Q	AST RESH INC	23	6	8.8	-0.3	-2.8
Q	AUTO TROL TECH CORP	9	3	4.0	+0.4	10.3
Q	8ANCTEC INC	16	5	6.5	-0.3	-3.7
Q	CIPHER OATA PROOS INC	18	4	7.1	+0.4	5.6
A	COGNITRONICS CORP	5	2	2.9	+0.0	0.0
N	COMPUGRAPHIC CORP	28	19	22.4	-0.6	-2.7
N	COMPUTERVISION CORP	23	7	14.9	+0.0	0.0
A	DATAPROOUCTS CORP	24	7	7.6	-0.4	-4.7
A	DATARAM CORP	9	5	6.0	-0.3	-4.0
N	OECISION INDS CORP	13	4	10.6	+0.1	1.2
N	EASTMAN KODAK CO	71	40	40.9	-1.9	-4.4
Q	E M C CORP MASS	29	10	12.5	-0.5	-3.8
Q	EMULEX CORP	9	4	5.3	-0.1	-2.3
Q	EVANS & SUTHERLANO	40	18	20.0	+0.8	3.9
Q	ICOT CORP	13	3	4.3	-0.3	-5.6
Q	INTERLEAF INC	24	9	15.9	+0.8	5.0
Q	IOMEGA CORP	8	1	2.9	+0.5	21.1
Q	LEE DATA CORP	10	3	3.1	+0.0	0.0
Q	MASSTOR SYS CORP	6	1	2.0	+0.1	3.2
Q	MAXTOR CORP	34	6	11.0	-0.9	-7.4
Q	MICROPOLIS CORP	44	13	18.5	+0.0	0.0
Q	MINISCRIBE CORP	18	5	7.4	-0.5	-6.3
N	MINNESOTA MNG & MFG CO	84	45	57.3	-0.8	-1.3
A	MSI DATA CORP	24	12	22.0	+0.8	3.5
Q	PRIAM CORP	6	1	1.5	-0.4	-20.0
Q	PRINTRONIX INC	13	7	8.6	+0.6	7.8
N	QMS INC	27	9	8.8	-1.4	-13.6
Q	QUANTUM CORP	35	8	10.5	-0.8	-6.7
Q	RAMTEK CORP	6	2	4.0	+0.1	3.2
N	RECOGNITION EQUIP INC	27	7	9.1	-0.8	-7.6
Q	REXON INC	14	5	6.0	+0.1	2.1
Q	SCAN TRON CORP	14	7	10.3	-0.3	-2.4
Q	SEAGATE TECHNOLOGY	46	10	15.1	-0.6	-4.0
N	STORAGE TECH CORP	5	1	2.0	+0.0	0.0
Q	TANDON CORP	7	2	1.6	-0.3	-13.3
A	TEC INC	7	3	5.1	-0.1	-2.4
N	TEKTRONIX INC	43	21	23.3	-0.5	-2.1
Q	TELEVIOEO SYS INC	3	1	1.3	+0.0	0.0
N	TELEX CORP	102	30	48.1	+1.6	3.5
Q	WYSE TECH	40	11	17.0	-1.9	-9.9
N	XEROX CORP	85	50	53.9	-3.0	-5.3
Q	XIDEX CORP	16	6	6.9	+0.5	7.8

Leasing Companies

Q	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.1	+0.0	0.0
N	COMDISCO INC	37	12	18.3	-0.5	-2.7
N	CONTINENTAL INFO SYS	14	5	6.0	+0.0	0.0
Q	PHOENIX AMERN INC	8	2	2.9	+0.0	0.0
Q	SELECTERM INC	6	3	4.0	+0.0	0.0

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Quicksand

Novell sinks fast as week proves sticky for most stocks

Major vendors in the mainframe, software and networking businesses took it on the chin, and high-tech stocks sagged in general, in trading last week. Leading the tumble as of Thursday's close was Novell, Inc., which lost more than 25% of its value to close at 17⅞, down 5⅞ points from a week earlier.

Other companies taking a bruising included Digital Equipment Corp., which dropped 4 points on Wednesday and finished at 117⅛, down 6¼ points from a week earlier, and Microsoft Corp., which fell 4¾ points to finish at 51.

Among the week's other losers, IBM fell 3¾ points to 108⅝ despite plans for a high-level restructuring; Sun Microsystems, Inc. sank 3½ points to 30; Lotus Development Corp. fell 2¼ points to 25¼; Compaq Computer Corp., whose announcement of its first billion-dollar sales year yielded no favorable result, dropped 4 points to hit 43⅜; 3Com Corp. fell 1⅞ points to 17⅝; and Ashton-Tate Corp. landed at 21 after losing 3 points.

The few bright spots in the week included Prime Computer, Inc., which rose ½ of a point to finish at 16¾; and Stratus Computer, Inc., which rose ⅜ of a point to 22.

JAMES DALY

Dbase IV

FROM PAGE 1

product scheduled to ship late this year.

The effort to provide a full implementation of SQL should sit well with the MIS community, which looks to SQL to provide applications portability and cross-systems connectability in the long run, said the analyst, who follows the SQL data base market.

Although the product's SQL is compatible with the syntax of DB2, there will be no communications links that would allow Dbase IV to query a DB2 data base. And while Ashton-Tate has adhered faithfully to the DB2 model, there is one minor area of incompatibility, according to a third-party developer briefed on the product. "It doesn't have the so-called dynamic SQL," the source said. Dynamic SQL is a feature available on DB2 but not applicable to personal computer use, the source said.

Compatibility

A key Ashton-Tate goal was to provide full compatibility between the current Dbase III Plus and Dbase IV. The products have the same file structure, and Dbase IV is upwardly compatible with Dbase III Plus. In addition, any applications written in Dbase IV that do not take advantage of added features will run unchanged under Dbase III Plus.

The SQL Server announced by Ashton-Tate and Microsoft will run existing Dbase applications.

However, because Dbase IV was developed before the specifications of SQL Server were finalized, users will have to upgrade to a later version of Dbase IV that meets those specifications in order to run the Dbase III Plus applications and connect to the server product.

The initial implementation of Dbase IV will not include communications facilities to other DBMSs, but these will be released over time, one source noted.

Despite the lack of communications facilities, SQL is an important element of the firm's future connectivity strategy. "It opens up the architecture to communicate with DB2 in the future, as well as other DBMSs such as IBM's OS/2 Extended Edition Data Manager and Lotus/DBMS," an analyst briefed by Ashton-Tate said.

Double offering

There are two modes under which SQL can be used. With the interactive or command mode, users can type SQL commands directly at the Dbase dot prompt. In the embedded mode, users or developers can write SQL procedures that are callable by a Dbase program, the former Ashton-Tate developer said.

In cases in which Dbase commands are duplicated by SQL, the commands are dropped in favor of SQL.

Unlike some data bases such as Oracle Corp.'s Oracle, which uses an SQL engine, Dbase IV maintains its Dbase engine. As a result, SQL commands are translated in the Dbase language when querying or manipulating data. "It is extremely transparent," the developer said.

Limitations

In addition, the product cannot translate Dbase into SQL, or use IBM's Query-by-Example or a forms system to generate SQL code. "In order to use SQL, you have to know it. But in the server version, Query-by-Example and the forms system will generate SQL," the developer said, referring to the Ashton-Tate/Microsoft SQL Server.

For ease of use, the Assistant, a menu-driven front end currently found in Dbase III Plus, has been replaced with the Control Center. The Control Center is a nonprocedural window-oriented interface that leads a user from one function to another. "It seems architected to take advantage of the OS/2 Presentation Manager," the source said.

For network uses, the initial version of Dbase IV will include automatic record and file locking. In addition, existing Dbase applications can be recompiled under Dbase IV and will take advantage of the automatic record and file-locking features, the developer said.

Besides adding SQL support, Ashton-Tate has added Dbase language extensions, many of which have been popularized by Dbase clone vendors, the developer said.

Banyan adds LU6.2, PU2.1

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Network integrator Banyan Systems, Inc. last week announced that it will incorporate LU6.2 and PU2.1 software licensed from Orion Network Systems, Inc. into its Virtual Networking Software (Vines).

The announcement marks the second critical element in Banyan's strategy to maintain IBM compatibility.

Last week, Banyan detailed plans to provide support for OS/2, which was developed by Microsoft Corp. and IBM and represents the first product release under IBM's Systems Application Architecture umbrella [CW, Feb 1].

At that time, the company also promised to support IBM's Netbios under OS/2, Advanced Program-to-Program Communications under OS/2 Extended Edition and the LAN Server Program.

Banyan initially announced plans to support LU6.2 in last summer's introduction of Vines Version 3.0. At that time, the vendor said it would first release an LU6.2 tool kit to developers and corporate programmers.

Support for LU6.2 not only enhances Banyan's ability to communicate with a range of IBM processors and systems but also extends the company's reach into the many non-IBM environments that will also support LU6.2.

Slated for release later this year, Banyan's LU6.2 offering will reportedly support the advanced communications protocols in IBM's Systems Network Architecture.

Math coprocessor solution no go for PS/2 Model 80

BY ALAN J. RYAN
CW STAFF

IBM's Personal System/2 Model 80 is unable to properly use Intel Corp.'s 80387 math coprocessor with a protected-mode demand-paged operating system. The hardware problem could potentially affect IBM's AIX operating system, a derivitive of AT&T's Unix System V.

To work around a known error in Intel's 80386 microprocessor that affects the interface to the math coprocessor under operating systems like Xenix and Microsoft Corp.'s Windows 386, several vendors have created fixes.

IBM, however, has made no hardware fix available to allow the use of the coprocessor under demand-paged operating systems on the Model 80.

An IBM spokesman said last week that because AIX will not be available until September, the company is still testing many of the inner workings of the Model 80. "It's premature to make a statement on what will or won't work. [AIX] is not due for another six months, so there's still a lot of testing going on at this point," the spokesman said.

The glitch reportedly can cause a 386-based computer to respond with an incorrect return value while performing a math function and can cause the machine to lock up.

Fixes currently on the market will not work properly on the Model 80, explained Bill Brothers, Xenix product manager at The Santa Cruz Operation, Inc., because they involve manipulating address lines. "The Model 80 decodes all address lines, so therefore, you can't play addressing games," he added.

Merger finalized

NATICK, Mass. — Prime Computer, Inc. announced the completion of its $400 million acquisition of Computervision Corp. last week and told Computervision users it would continue to support all current products from that company.

"I want to reassure Computervision's customers . . . that they will not be forced to migrate from their current product investments," Prime President and Chief Executive Officer Joe M. Henson said in a statement.

Prime also announced that Computervision's marketing will be folded into Prime's so that the merged organization will sell both Prime and Computervision products.

Marketing will be bisected along vertical market lines, with one division selling to manufacturing customers and the other to commercial and technical users.

Each division is expected to account for 50% of total sales, according to Prime.

In his statement, Henson also said the company has no plans for layoffs as a result of the merger, but he did not rule them out.

Prime will attempt to find jobs within the company for employees in positions made redundant by the merger, he said.

Trouble hits AI companies

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Seeking to stem the tide of continuing financial losses, troubled Symbolics, Inc. announced the resignation of its two top officers last week.

Meanwhile, Teknowledge, Inc., a Palo Alto, Calif.-based maker of expert systems software, said it will lay off approximately 60 of its 100 workers as the company ceases direct-marketing efforts. In the future, Teknowledge will only license its products, the company said.

At Symbolics, Brian Sear stepped down from his post as president, chief operating officer and member of the board, and Russell Noftsker resigned as chief executive officer. Noftsker will continue as chairman.

The company's board of directors said it will begin an immediate search to fill the single position of president and CEO.

Analysts said slow demand for artificial intelligence computer systems such as the ones Symbolics markets, compared with brisk demand for general-purpose systems that can run AI applications, could be the source of the trouble.

In its second-quarter results, posted in January, Symbolics lost $15.4 million on revenue of $23.8 million. The loss included an $11.2 million charge for restructuring costs.

Teknowledge reported second-quarter revenue of $3.8 million and a loss of $6.7 million, including a $5.8 million restructuring charge.

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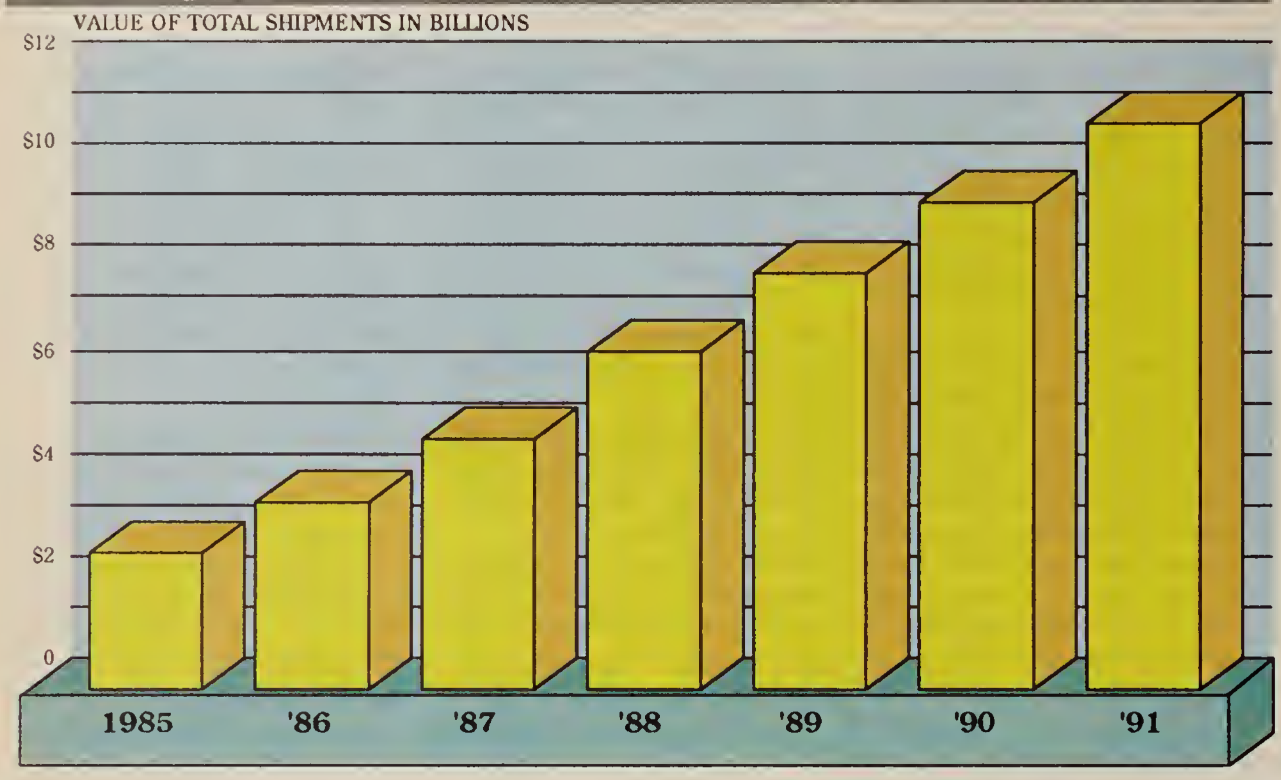
TRENDS

The Unix market

Growing steadily, Unix shows it's here to stay



Once considered just a techie's toy, the Unix operating system will continue on an already steady growth path to reach more than $11 billion in revenue by 1991, according to International Data Corp. (IDC) in Framingham, Mass.

The operating system will likely be taken more seriously as it chips away at the commercial market, primarily because it is nonproprietary and "frees users from the bonds of any one vendor," IDC reported.

Of all the Unix markets, the single-user is the most volatile; the mid-range and large-scale systems markets have stabilized with a set group of players.

The single-user market "is the area where we expect the most growth," said Kate Comiskey, a Unix analyst at IDC. "Unix will be showing up on more desk tops, and we expect lots of shifting around until this market becomes more defined."

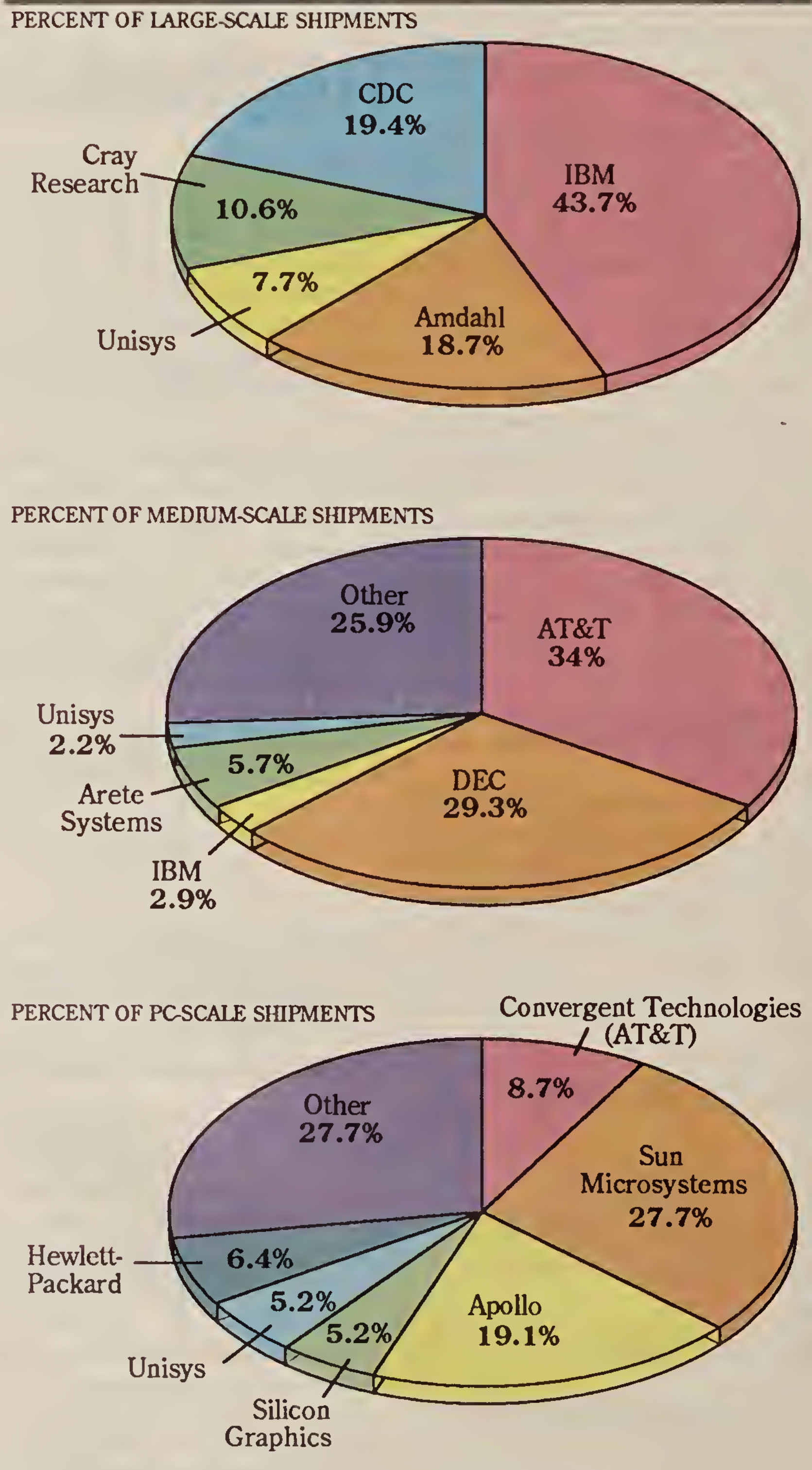
Comiskey said the mid-range systems market appears to be the most stable of all segments. Although AT&T remains at the top of this market, it is also losing market share.

In 1985, AT&T held a 43.2% market share, while Digital Equipment Corp. accounted for 24.6%. A year later, AT&T's share had slipped to 34%, while DEC's moved up to 29.3%.

In the large-scale systems segment, IBM has captured nearly half of the market. Comiskey said IBM's 43.7% share represents all Unix versions running on IBM mainframes, including Amdahl Corp.'s UTS.

ROSEMARY HAMILTON

PC market volatile; higher end mature



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHARTS

INSIDE LINES

Out of the wild blue vapor. Cullinet last week began shipping its IDMS/R release that includes the ability to process SQL queries — four months behind the schedule Cullinet officials announced at a September 1986 press conference that heralded the company's "blueprint" for the future. In addition to read-only SQL capabilities, Release 10.2 of Cullinet's hierarchical DBMS incorporates an average 11% performance improvement.

No-fault data base. A 14-month-old joint development project between Stratus and Sybase may finally bear fruit. Stratus expects to make available in April the capability for Unix workstations to extract and manipulate data from Sybase SQL-based data bases residing on its fault-tolerant systems. Stratus has offered the Oracle data base with its machines for a number of years but reportedly opted for a higher performance data base engine from Sybase, the company that developed the technology for the recently announced SQL Server.

Primary soundings. For IBM watchers still trying to assess the presidential chances of new U.S. General Manager Terry Lautenbach, a bit of history may prove enlightening. When Lautenbach was named president of IBM's old Data Processing Division in 1976, the man he succeeded in that post was current IBM Chairman and CEO John F. Akers.

Jumping the gun. AST Research will announce this week the details of its version of Microsoft and IBM's OS/2, the company says. AST's OS/2 precedes the expected Feb. 17 announcement of Compaq's OS/2 version and will presumably take advantage of the AST Premium/386's multiprocessor capabilities that mimic IBM's Micro Channel.

An obvious scoop. The scandal over a $55 million federal contract for 12 network switches took a new twist last week. For weeks, AT&T has complained that a General Services Administration (GSA) official leaked AT&T's bid price to competitors. Then came a newspaper report that AT&T also got a "confidential" tip from the GSA. It's true that AT&T was told that a $40-per-connection bid for the Washington, D.C., switch would be too high, but that was an obvious point, since the request for proposals for that switch required a bid of less than $37.

The bean counters always ring twice. Management Science America (MSA) has frozen employee salaries for six months and cut executive salaries by 3% to 10% in an attempt to make the company profitable this year. Fiscal 1987 results won't be announced until March 1, but in September, MSA reported a loss of $68.4 million for the first three quarters. MSA is one of the first major software vendors to adopt rules requiring revenue to be counted when a product is shipped rather than when a contract is signed, as recommended by the American Institute of Certified Public Accountants, and $68 million of MSA's loss was attributed to the rule change. At times, there was a four- to five-month lag in shipments, according to Chris Mortenson of Alex Brown & Sons in Baltimore.

Plug this into your Walkman. Emerald Systems plans to introduce this week a version of its tape backup system that allows Xenix-based systems to store up to 2.2G bytes on a calculator-size cassette. The Vast Device for Xenix, which measures 12 by 9½ by 6 in. and uses Emerald's 8mm cassettes, reportedly allows much larger hard disks to be attached to Xenix-based systems. Vast Device holds the equivalent of 6,200 floppies, or one million sheets of paper, and is priced at $6,995.

Extended invitations. IBM has approached several software developers in recent weeks, particularly data base developers, about writing front ends for its OS/2 Extended Edition. "If you look at the specs of OS/2 Extended, it is a pretty plain-Jane kind of system that's missing some of the nice front-end tools. They are working with key developers to help them put together some popular front ends," one source says. None of the major DBMS developers contacted last week, however, would admit to having a copy of the operating system.

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